

good sized pillars were found. At the end of the year scrambling work on the 2nd Level, in this territory, had been completed. Above the 3rd Level, a pillar is being mined on a sub-level, and a raise is being put up in another ore pillar near the Stephenson boundary. On the 4th Level, a drift is being driven towards the Stephenson boundary line along the footwall to the South-East of the shaft, from which one or more raises will be put up to mine the floor of the pillars which have been found on the 3rd Level. When it is considered that places must be found in the shaft pillar for the balance of contracts and such work must be carried on without caving the shaft, or stockpiles, it can readily be seen that it is impossible to maintain a uniform product. It is expected that the work as now planned will permit of continued operations through the winter, by which time it is thought all the ore below the 3rd Level will have been mined, which will permit of the transfer of operations to No. 2 shaft.

The estimated tonnage in the mine, sub-divided as required by the Tax Commission, is as follows:

Bessemer Ore:		
Developed,	1. Austin Bessemer,	69,176 tons
Non-Bessemer Ore:		
Developed,	1. Austin,	10,985 "
	2. Austinport,	56,721 "
Prospective,	1.	-----
	TOTAL,	136,882 "

In November and December there was some extraordinary expense at the Austin due to construction work in connection with the change of operations from No. 1 to No. 2 shaft. The construction of trestle from No. 2 shaft to the loading pocket was started and about 65% completed at the end of the year. The frame of the loading pocket has been erected and at the

close of the year the pockets were nearly completed. It is uncertain how soon it will be necessary to abandon the old shaft and transfer operations to the new. It was, therefore, necessary to complete the construction work for the change as rapidly as possible, so that there might be no long delay when the present shaft was abandoned.

Work has been done during the year 1922 at the following points:

SUBS ABOVE 1ST LEVEL
1ST LEVEL
SUBS ABOVE 2ND LEVEL
2ND LEVEL
SUBS ABOVE 3RD LEVEL
3RD LEVEL
SUBS ABOVE 4TH LEVEL
4TH LEVEL
SUBS ABOVE 5TH LEVEL
5TH LEVEL
SUBS ABOVE 6TH LEVEL
6TH LEVEL

3RD SUB ABOVE 1ST LEVEL (77' Below Surface)

There has been 100 feet of ore drifting on this sub-level, which was opened as a result of development work on the footwall above the 2nd sub-level. The raise to this sub-level is up 30 feet above the 1st level, and an additional elevation of 7 feet was gained from the raise to the point where drifting was done this year by blocking up the tracks. This sub-level was originally opened when the mine was operated in 1919, but no ore was found. Drifting was resumed in November, 1922, and after blasting two cuts in rock, ore was found. The ore body at this point is due to a roll in the formation, and as its existence was not known before, it may be considered as a new discovery, and as such is an addition to the previous estimates of ore in the shaft pillar above the 1st Level. The size of the ore body on this sub-level warrants a rock drift on the 1st Level, to permit of raises being put up to develop and mine it at higher elevations. It is planned to drive this rock drift as soon as possible, and start mining this ore body. In December, the ore settled off the

hanging at one point in the drift, showing that it had a thickness of over 20 feet.

2ND SUB ABOVE 1ST LEVEL. (96' Below Surface).

This sub-level was opened in 1922 from two raises; one raise was located on the East side of the shaft pillar. At this point there has been 160 feet of ore drifting. The ore was followed up on the footwall for a distance of 15 feet, the ore being from 3 to 5 feet in thickness at this point. The ore had to be handled several times on the foot and it was decided to go to the 3rd sub and start drifting towards the foot. It is not advisable to do any further work on this part of the sub-level until the Bessemer stockpile on surface is removed.

On the West side of the shaft pillar this sub-level was opened, and after cross-cutting 70 feet to the North to the footwall, a drift was driven 65 feet to the North-West, where it encountered the old workings at the end of the shaft pillar. It was decided to mine out this block of ore next to the old cave, the area being approximately 70 x 65 feet in size. Approximately 5/6 of this area had been mined at the end of the year. As a result of mining here, the old cave has been extended some 30 feet to the South-East. The ore in this territory does not extend up on the footwall due to an over-turn in the formation, which causes the foot and hanging to come together.

The balance of the ore in the shaft pillar on this sub-level has an area of approximately 130 feet x 70 feet.

1ST SUB ABOVE 1ST LEVEL. (106' Below Surface)

The last of the year a raise was put up near the West end of the shaft pillar to the elevation of this sub-level. The raise is located near the line of the old workings. As soon as mining is completed at

this point on the 2nd sub-level, mining will start on the 1st sub.

FIRST LEVEL.
(116' Below Surface)

When the mine re-opened in June, all broken sets were repaired on the 1st Level in the haulage drift from the shaft to the ore body. There also has been 90 feet of drifting done on the 1st Level, since the mine re-opened, which has proved up the area of the shaft pillar on the West side of the haulage drift. Lean ore and jasper was encountered in the drifts, and as a result it has been necessary to decrease the estimated tonnage in the shaft pillar on the 1st Level. The pillar on the 1st Level has a length of 150 feet, and an average width of 70 feet, as compared with the former estimated area of 250 feet by 70 feet.

1ST SUB BELOW 1ST LEVEL (128' Below Surface).

This sub-level was developed when the mine was operated several years ago, by a drift the extreme length of the shaft pillar. There is a barren area at the West end of the pillar approximately 120 feet in length, between the shaft pillar and the old cave. In order to prepare for mining, a drift was driven 60 feet in rock on this sub-level from a raise West of the shaft, at which point it holed to the old sub-level. It was necessary to take up about 3 feet of ore in the floor of the old sub-level drift for a distance of 40 feet in order to get proper grade for tramming. A drift has been started towards the footwall, following the lean ore at the West end of the shaft pillar. It is planned to outline the ore and do some mining at this point.

2ND SUB BELOW 1ST LEVEL (143' Below Surface)

This sub-level was opened several years ago, and during the past several months approximately 200 feet of the old drifts were re-timbered. Considerable ore was recovered in this work, due to the ore breaking loose

from the back of the drift up to the hanging at several points.

3RD SUB BELOW 1ST LEVEL (155' Below Surface)

South-East of the shaft, near the Stephenson boundary line, one raise was put up to the elevation of this sub-level in an ore pillar which had been found on the footwall. A drift was driven 30 feet to the footwall, and the footwall followed to the North and South to the limits of the pillar. The extreme length of the pillar was 80 feet, with an average width of 30 feet. Mining was completed on this sub-level the last of December. All tools and material was removed and the contract employed here is now engaged in taking up rail in the 2nd Level drift, back of the shaft pillar.

SECOND LEVEL.

(178' Below Surface)

When the mine re-opened, the timber on the 2nd Level was repaired. The last time the mine was operated a drift was driven in the old workings a distance of 510 feet South-East of the shaft. When the mine re-opened, this drift was repaired and drifting resumed. It was continued for a distance of 240 feet to the end of the ore body. The last 70 feet was in a solid ore pillar. Sand was encountered in caved workings at a point approximately 10 feet North of the Stephenson boundary line. The ore pillar at this point has been mined; also all the ore above the level. Several crosscuts were driven through the old workings to discover if any other pillars had been left. All available ore was removed in this territory by the end of December and the contract is now engaged in taking out the rail, preparatory to abandoning operations in the old workings.

A small area approximately 50 x 25 feet in width was mined at the South-East end of the shaft pillar. North-West of the shaft one slice was mined at the end of the shaft pillar. There was also 50 feet of drifting through the old workings North-West of the shaft along the footwall. Loose rock was encountered in the last 10 feet of this drift, and work was temporarily stopped; drifting will be resumed here later.

3RD SUB BELOW 2ND LEVEL. (210' Below Surface)

This sub-level was opened in December about 300 feet North-West of the shaft, where the 3rd level drift through the old workings along the footwall showed an ore pillar. At the end of the year, a crosscut had been driven from the raise 30 feet to the North toward the footwall, in solid ore. The extent of this pillar is unknown.

4TH SUB BELOW 2ND LEVEL. (225' Below Surface)

This sub-level was opened in a pillar found along the foot near the Stephenson boundary line. A cross-cut was driven 35 feet to the East to the footwall, and at the end of the year a drift had been driven 60 feet to the South in the ore pillar following the footwall. The limits of this ore pillar, which was left when the sand came into the mine many years ago, has not yet been reached. There is apparently considerable ore on this sub-level.

THIRD LEVEL

(234' Below Surface).

Since the mine re-opened, more work has been done on the 3rd than any other level. In addition to drifts following the footwall

South-East and North-West of the shaft, mining has been carried on in the shaft pillar.

North-West of the shaft there has been 250 feet of drifting following the footwall through the old workings. Some ore has been obtained from this drift along with old timber and caved rock from the hanging. One ore pillar has been found on the footwall which is now being mined on the 210 ft. sub-level. There is still 150 feet of drifting to be done to reach the West limits of the ore body. It is planned to continue drifting along the footwall to this point; also to drive several cross-cuts through the old workings in the hopes that some ore pillars will be found in this territory.

South-East of the shaft, the drift along the footwall has been driven a distance of 330 feet to the Stephenson boundary line. Part of the last 200 feet of this drift has been in ore extending up a distance of from 3 to 5 feet above the floor. The last 70 feet was in a solid ore pillar. Sixty feet North of the Stephenson boundary line a cross-cut was driven towards the hanging, which proved up an ore pillar 60 feet in width from foot to hanging and about 50 feet in length. One-hundred and eighty feet North of the boundary line a crosscut was driven from foot to hanging, in which solid ore was found in the bottom of the drift, extending up a distance of approximately 3 feet; the upper part of the drift was in caved ore and timber. Ore was left in this territory on account of the sand-run. At several points old drifts had been found which were filled with dry sand. On account of work on the sub-levels above the 3rd level, near the Stephenson boundary line, it has not been possible to complete mining of the pillars found on the 3rd level.

At the South-East end of the shaft pillar an area 70 x 50 feet has been mined out. Two slices have been driven under the hanging in the shaft pillar to the West of this point. Mining is now in progress in the shaft pillar below the 3rd level. The balance of the pillar on the 3rd level will be mined when mining has been completed on the sub below.

1ST SUB BELOW 3RD LEVEL. (248' Below Surface)

At the South-East end of the shaft pillar an area 100 feet in length by 30 feet in width had been mined out. Mining is now in progress at this point. One drift approximately 60 feet in length has been driven through caved ground at the West end of the shaft pillar in order to mine a small pillar of ore 35 feet by 20 feet in size. It will require several months to finish mining the ore on this sub-level.

FOURTH LEVEL.
(282' Below Surface)

When the mine re-opened several small pillars were removed on the 4th level. These pillars were located in the shaft pillar, and were the only ore remaining on this level. In November, the developments on the 3rd level, near the Stephenson boundary line South-East of the shaft, warranted re-opening the old footwall drift to this territory on the 4th level, in order that some raises might be put up to mine the ore in the floor of the 3rd level. Drifting was started here, and by the end of the year the old footwall drift had been re-opened for a distance of 170 feet.

In order to provide additional working places, it was decided to put up another raise from the 4th level to the 1st sub below the 3rd.

This raise is located in the shaft pillar and will permit two gangs to work on the 1st sub below the 3rd, one mining the pillar South-East of the shaft and the other the pillar North-West of the shaft.

1ST SUB ABOVE 5TH LEVEL (300' Below Surface)

There was a small pillar left on this sub-level which was mined shortly after the mine re-opened. More ore was obtained from this pillar than was anticipated due to the flattening of the footwall. The area mined here was approximately 80 feet in length by 40 feet in width.

FIFTH LEVEL.

The old records showed three small pillars left on the 5th level. When the mine re-opened, the work of removing these pillars was started. Some ore was obtained from two pillars, the third pillar was not found. The ore in this pillar had evidently been mined from the sub below the 5th. Work was completed here the last of July. The latter part of the year, rail, air lines, puffer for hoisting up the incline from the 5th level, and the pump in skip pit were removed from this level. A traveling road was constructed from the shaft to the point where the incline goes down to the 5th, high enough above the floor of the drift so as to make a good traveling road to the Stephenson Mine, or the second outlet. The removal of the pump from the 5th level, which was operated to keep the water out of the skip pit, permitted the water to stand on the 5th level until it had reached a height above which it would run down the incline to the 6th level and hence to the Stephenson Mine. The water is about

two feet deep at the plat on the 5th level. The traveling road referred to above is built above the water.

SUBS ABOVE SIXTH LEVEL.

There was a small amount of ore on the subs above the 6th, consisting mainly of the triangle of ore on the foot. Several gangs worked here for some time after the mine re-opened, as more ore was found than was anticipated.

SIXTH LEVEL.

The latter part of the year the rail and pipe on the 6th level was removed, as all ore has been mined on this level.

AUSTIN SURFACE.

Some repair work was done in April in anticipation of this property re-opening. One of the pulley stands which had blown down in the previous winter was rebuilt. A number of repairs were made to the engine house, as also the top tram engine house. The top tram engine was taken out, moved to the shops and over-hauled. A number of repairs were also made to the shaft house, new timbers being placed under the head-frame and the skip and cage roads repaired.

In June, when the mine started operating, five bents were erected on the Bessemer stocking trestle, as this stocking trestle had been torn down when ore was shipped in 1920. The bents on the Austinport stocking trestle were raised, as they had settled out of line. Also some new runners were installed in the shaft house in both the cage and skip roads. There was no further unusual surface work at this property until in October, when the work in preparation for changing operations from No. 1 to No. 2 shaft was taken up. The ground between the site of the new engine house and No. 2 shaft was cleared of timber. The work of making a new timber yard was started in November, a strip of low ground near the approach to the Central Power Plant coal dock was cleared and leveled with cinders.

The last of November work was started on the erection of trestle from No. 2 shaft to loading pocket; at the end of the year the trestle had been extended across the pit near No. 2 shaft about half way to the loading pocket. Work was also started on the loading pocket, the frame of which was completed at the end of the year. It is planned to continue the work of equipping No. 2 shaft during the next several months, as it is uncertain how long the present shaft

can be continued in operation.

Owing to the shortage of water in the storage basins, it was decided to lay in a supply of coal at the Central Power Plant so that if necessary the turbines could be operated during the winter. In order to stock this coal it was necessary to erect ten additional bents on the coal dock. Approximately 2,800 tons of coal were unloaded at this dock in October and November.

The Central Power Plant operated part of the month of December. Some work was done during the summer and fall over-hauling the plant and getting it ready to operate.

AUSTIN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Austin Bessemer,	60.45	.053	6.02	-
Austin,	60.75	.057	4.75	.345
Austinport,	59.49	.257	6.69	.364

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Austin Bessemer,		(All Mixed)		
Austin,		(All Mixed)		
Austinport,		(All Mixed)		

ORE STATEMENT - DECEMBER 31ST, 1922.

	AUSTIN BESSEMER	AUSTIN	AUSTINPORT	TOTAL	TOTAL LAST YEAR
On hand January 1, 1922,	-	-	8,970	8,970	8,970
Output for Year,	26,555	-	24,350	50,905	-
Transferred	190	140	50	-	-
Total,	26,365	140	33,370	59,875	8,970
Shipments,	2,211	140	2,714	5,065	-
Balance on Hand,	24,154	-	30,656	54,810	8,970
Increase in Output,				50,905	
Increase in Ore on Hand,				45,840	

1922 -- Mine Idle Jan. 1st to June 4th, 1922.
2-8 Hour Shifts, 6 days per week, June 5th to Dec. 31st, 1922.

1921 -- Mine Idle during Year.

AUSTIN MINE
SHIPMENTS FOR YEAR 1922.

	GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Austin Bessemer,		2,211	-	2,211	-
Austin,		140	-	140	-
Austinport,		2,714	-	2,714	-
	Total,	5,065	-	5,065	-
Total Last Year,		-	-	-	-
Increase,		5,065	-	5,065	-

Darnassell
Bond
MADE IN U.S.A.

Damascus Bond

AUSTIN MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	50,905	-		
Underground Costs	1.327			
Surface Costs	.271			
General Mine Accounts	.150			
Cost of Production	1.748			
Plant Account	.037			
Taxes	.039			
Central Office	.079			
Contingent Expense	.008			
Cost Adjustment	.015			
Cost on Stockpile	1.926			
Loading & Shipping	.011			
Total Cost on Cars	1.937			
No. Days Operating	172			
No. Shifts & Hours	2-8hr			
Avg. Daily Product	296			
<u>COST OF PRODUCTION</u>				
Labor	1.308			
Supplies	.440			
Total	1.748			

NOTE: Mine idle 1921
Production started June 5, 1922.

Damascus Bond

AUSTIN MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	50,905		50,905	
No.Shifts & Hours	2-8hr			
AVG. NO.MEN WORKING				
Surface	12	2	10	
Underground	40		40	
Total	52	2	50	
AVG.WAGES PER DAY				
Surface	3.70	4.12	.42	
Underground	4.25			
Total	4.11	4.12	.01	
WAGES PER MO. OF 25 DAYS				
Surface	92.50	103.00	10.50	
Underground	106.25			
Total	102.75	103.00	.25	
PRODUCT PER MAN PER DAY				
Surface	13.31			
Underground	4.32			
Total	3.26			
LABOR COST PER TON				
Surface	.278			
Underground	.985			
Total	1.263			
AVG.PRODUCT BRK'G & TRM'G	7.05			
" WAGES CONTRACT MINERS	4.33			
" " " TRAMMERS	4.60			
" " "	4.36			
TOTAL NO. OF DAYS				
Surface	3,823	331 $\frac{1}{4}$	3491-3/4	
Underground	11,794		11794	
Total	15,617	331 $\frac{1}{4}$	15285-3/4	
AMOUNT FOR LABOR				
Surface	14157.89	1365.71	12792.18	
Underground	50137.58		50137.58	
Total	64295.47	1365.71	62929.76	

Proportion Surface to Underground Men:

1922 - 1 to 3.3
 1919 - 1 to 2.1
 1918 - 1 to 3.2

Not producing in 1918 on account of flood.
 Started production on small scale again in
 August, 1919. Closed again Dec.31, 1919. Not
 operated during 1920 or 1921.

1922.

Production started June 5,1922. 2-8hr shifts.

AUSTIN MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1922.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1 9 2 2	AMOUNT 1 9 2 1
4 to 6" Timber	2,276	.0178	40.54	
6 to 8 "	10,322	.0283	294.53	
8 to 10 "	19,116	.0564	1,080.27	
10 to 12 "	10,888	.0796	866.76	
12 to 14 "	4,736	.1072	507.75	
14 to 16 "	366	.1218	44.58	
Total - 1922	47,704	.0594	2,834.43	
5' Lagging	149,175	.796	1,187.06	
8' "	63,024	.635	397.38	
Total Lagging	212,199	.746	1,584.44	
Poles	37,340	1.0567	394.59	
Total Lagging & Poles	249,539	.793	1,979.03	
5/8 Covering Bds.	10,657	1.286	136.78	
Product			50,905	
Feet of timber per ton of ore			.936	
" lagging "			4.168	
" " per foot of timber			4.448	
Cost per ton for timber			.0557	
" lagging			.0311	
" poles			.0077	
" covering boards			.0027	
" timber, lagging, poles, & bds.			.0972	
Equiv. of stull timber to bd. measure			98,682	
Ft. Bd. measure per ton of ore			1.938	
Total cost for timber, lagging & poles - 1922			4,950.24	

Mine worked 6 days per wk. June 5th to Dec. 31, 1922. - 2 shifts.

AUSTIN MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY	AVERAGE PRICE	AMOUNT 1922	AMOUNT 1921
40% Powder	11,050	.1364	1,507.78	
50% "	3,700	.1466	542.45	
60% "	50	.18	9.00	
Total Powder	14,800	.1391	2,059.23	
Fuse	40,700	.736	299.52	
Caps	11,500	1.151	132.45	
Cap Crimpers	7	.503	3.52	
Total Fuse, Etc.			435.49	
Total All Explosives			2,494.72	
Product			50,905	
Pounds Powder per Ton of Ore			.297	
Cost Per Ton for Powder			.0404	
" " Fuse, Etc.			.0085	
" " All Explosives			.0489	
Avg. Price per Lb. for Powder			.1391	

Mine operated 6 days per week June 5th to Dec. 31, 1922, 2 shifts.

STEPHENSON MINE.

The mine was operated on half time basis until June 5th, ore being hoisted 8 hours per day. The miners worked eight hours on alternate days, as there were not enough working places to operate on a 4-hour shift each day. On June 5th the mine started operating full time, ore being hoisted on day shift only. In August, when the skip hoist was changed from steam to electric, ore was hoisted on both day and night shift, due to trouble with the hoist, which rendered it impossible to hoist the product in eight hours. After the hoist was repaired so that it would operate satisfactorily, hoisting was continued on both shifts, as operating conditions underground were much improved by emptying the chutes each 24-hour period.

The product by months for the year was as follows: (Includes ore hoisted from Stephenson and C. & N. W. Ry. Co. Lease, Section 29).

January,	15,436 tons
February,	15,520 "
March,	16,020 "
April,	12,832 "
May,	14,572 "
June,	18,432 "
July,	18,999 "
August,	15,569 "
September,	16,461 "
October,	20,542 "
November,	18,865 "
December,	<u>19,977 "</u>
Total Ore,	199,223 tons.
Rock,	<u>22,346 "</u>
Total Ore and Rock,	221,569 "

During the time the mine operated half time, the product averaged about 14,500 tons per month; when operations were resumed on full time basis the product increased over 4,000 tons per month, except in the

month of August, when the mine was idle for a week during the time that the skip hoist was changed from steam to electric. The highest tons per man per day was made in the month of December, when operating conditions were good throughout the entire month.

The ore statement, showing the amount on hand January 1st, 1922, the output for the year, shipments for the year and the amount on hand January 1st, 1923, is as follows:

	<u>STEPH. BESS.</u>	<u>STEPH. NO. 1</u>	<u>STEPHEN- SON</u>	<u>STEPHEN- WOOD</u>	<u>NORTH- DALE</u>	<u>TOTAL</u>
On Hand Jan.1, 1922,	64,157		114,647	48,903	1,957	229,664
Output for Year,	15,927	8,213	167,994	14,000	7,089	213,223
TOTAL,	80,084	8,213	282,641	62,903	9,046	442,887
Shipments,	66,543	8,213	77,016	48,808	1,942	202,522
In Stock Jan.1st,1923,	13,541	0	205,625	14,095	7,104	240,365

Note:-- The 14,000 tons "Stephenwood Ore" is estimated stockpile overrun.

Shipments in 1922 were 202,522 tons as compared with 77,077 tons in 1921, the increase in 1922 being 125,445 tons. There were 240,365 tons in stock January 1st, 1923, as compared with 229,664 tons on January 1st, 1922, the increase in 1922 being 10,701 tons. The product of 14,000 tons "Stephenwood" ore is the estimated stockpile over-run; it is included in the product for the year but was not hoisted in 1922. Deducting this 14,000 tons "Stephenwood" from the product shows an actual increase of 2,684 tons in the product for 1922, as compared with the previous year.

There was a decrease of 44,244 tons in the Bessemer product in 1922; there were increases in all the other grades except "Northdale", which is the ore from C. & N. W. Ry. Co. Lease, Section 29, which showed a decrease of 9,800 tons.

The estimated ore in sight on the Stephenson Lease on December 31st, 1922 was 911,459 tons, a year ago it was estimated to be 1,012,785.

The decrease in 1922 was 101,326 tons, but since the product from the Stephenson Lease in 1922 was 192,154 tons, there is actually an increase of 90,808 tons shown by the estimate of December 31st, 1922. This increase is due to additional tonnage proven up between the 5th and 6th Levels as a result of development work which has rendered it possible to more accurately estimate both the developed and prospective ore in this territory.

The ore body found at the South-East end of the 6th Level in 1921 was outlined in 1922; also two drill holes were put down in this territory which gave information as to the amount of ore below the 6th Level on the Stephenson property. No ore was mined here in 1922, as this ore body is considered unavailable until the water level has been lowered. Mining can be resumed at the present top of the ore body, or the 2nd sub below the 4th Level, as soon as the water is lowered 10 feet, but the water must be continually lowered to permit mining at lower elevations. When the water has been lowered from 40 to 50 feet, all the ore on the Stephenson Lease can be mined.

Additional raises were put up during 1922 from the 6th Level to the 5th, in the main Stephenson ore body. From the information thus gained it was possible to more accurately estimate the developed and prospective ore in this territory. Due to lack of information, it is not possible to accurately estimate the division by grades of the ore in this territory. The old surface diamond drill holes showed a large amount of Bessemer ore; development work, however, has shown that at some places near the hanging the ore does not run uniformly low in Phosphorus, the Phosphorus content changing from day to day, so that it has been impossible to make a Bessemer grade.

The ore in sight on December 31st, 1922, was as follows:

LOCATION:	STEPHEN- SON BESS.	STEPHEN- SON NO.1	STEPHEN- SON	STEPHEN- WOOD	TOTAL
Ore above 1st Level,				4,893	4,893
" " 3rd "				1,533	1,533
" " 4th "	10,000	10,000	44,939	33,894	98,833
" " 5th "	50,000	50,000	69,032		169,032
" " 6th "	60,000	60,000	162,259		282,259
Developed Ore,	120,000	120,000	276,230	40,320	556,550
Prospective, 6th to 5th,	30,000	30,000	208,129		268,129
" below 6th,	15,000	15,000	54,376		84,376
Prospective Ore,	45,000	45,000	264,909		354,909
TOTAL ORE,	165,000	165,000	541,139	40,320	911,459

The estimated tonnage in the mine sub-divided as required by the Tax Commission, is as follows:

Bessemer Ore:

Developed	1. Stephenson Bessemer,	120,000 tons
Prospective	1. Stephenson Bessemer,	45,000 "
	Total Bessemer Ore,	165,000 tons

Non-Bessemer Ore:

Developed	1. Stephenson No. 1,	120,000 "
	2. Stephenson,	276,230 "
	3. Stephenwood,	40,320 "
Prospective,	1. Stephenson No. 1,	45,000 "
	2. Stephenson,	264,909 "
	3. Stephenwood,	
	Total Non-Bessemer Ore,	746,459 tons
	Grand total,	911,459 "

When the water was pumped out of the mine and operations resumed in 1920, the problem of gaining control of the water was taken up and this work has since been continued. The expense for this work is charged under the account "Pumping Machinery", and it may properly be called an

extraordinary expense. Considerable expense has been incurred on this work during the past three years. More actual progress was made in 1922, but unfortunately the problem has not as yet been solved. The work, however, has advanced to a point that, barring unforeseen difficulties, it is expected the problem will be successfully solved early in 1923.

Both the skip and cage hoists were changed from steam to electric, the work being started in August and practically completed by the end of the year. The cost of this work has been charged directly to operating expense, and as it cost about \$25,000.00, it has had an appreciable influence on the cost of the ore produced in 1922.

The mining of the Stephenson ore body down to the floor of the 5th level was nearly completed at the end of the year. A number of pillars have been left to support the haulage roads, and others are now unavailable on account of the danger from water. Mining in the ore body below the 5th Level has been started, and by the middle of the coming year practically all gangs will be working below the 5th Level. If the water level can be lowered from 40 to 50 feet, it will be possible to mine all the ore on the Stephenson Lease. If control is not gained of the water, however, and the rate of lowering remains fairly constant during the next several years, an estimate shows that there is not to exceed four years product available on the Stephenson Lease.

Measurements of the water level in several stand-pipe holes on the Stephenson and C. & N. W. Ry. Co., property have been taken during the past year.

The following table shows that the water level has been lowered in all but one of the holes measured. The hole in which the water raised 0.20 ft., #54, is located 1,200' South of the deep basin on Section 29. The ledge rises rapidly in this direction, the present water level being only 1.20 feet above the ledge. The water at this hole is undoubtedly

the incoming water from the South and will continue to come even after the water is lowered, many feet in the deep basin.

The record of measurements for 1922 is as follows:

	NO."C".	NO."W".	NO.54	NO.59	NO.61	NO.66
Elev. Ledge:	1030.00	999.00	1066.00	959.00	949.00	876.00
Date:						
Dec. 30, 1921	1037.80	1067.90	1067.00	1066.90	1062.30	1042.60
Feb. 1, 1922	1036.50	1067.90	1067.00	1066.20	1061.70	1041.40
Mar. 1, "	1035.60	1067.90	1066.90	1065.80	1061.10	1040.30
Apr. 5, "	1035.40	1066.90	1066.50	1065.40	1060.40	1039.40
May, 2, "	1035.20	1068.30	1066.70	1066.70	1060.90	1038.90
June, 1, "	1035.20	1068.70		1067.40	1061.90	1024.70
July, 8, "	1034.90	1069.10	1070.60	1067.50	1061.60	1028.10
Aug. 11, "	1035.00	1068.70	1069.80	1067.30	1061.80	1033.00
Oct. 3, "	1034.50	1068.10	1068.40	1066.80	1061.20	1035.30
Nov. 28, "	1034.40	1067.20	1067.30	1065.90	1060.40	1036.00
Dec. 31, "	1034.20	1066.50	1067.20	1065.20	1059.80	1035.10
Net change for Year,	Lowered 3.60 Ft.	Lowered 1.40 Ft.	Raised 0.20 Ft.	Lowered 1.70 Ft.	Lowered 2.50 Ft.	Lowered 7.50 Ft.

The interesting feature of the above table is the evidence that the general water level is being slowly lowered. In other words, more than the natural incoming water is being pumped at the present time. The rate of lowering, unfortunately, is less than in any previous year since the mine was unwatered in 1919. The rate is too slow to be of any practical benefit in making it safe to mine the ore now considered unavailable on account of danger from water. It emphasizes the importance of quickly solving the problem of lowering the water level over the ore body.

STEPHENSON LEASE - SECTION 20.

Work has been done during 1922 at the following points:

3RD & 4TH SUBS BELOW 4TH LEVEL
FIFTH LEVEL
1ST, 2ND, 4TH AND 5TH SUBS BELOW FIFTH LEVEL
SIXTH LEVEL

3RD SUB BELOW 4TH LEVEL:

Mining was finished on this sub-level in 1921, with the exception of a small pillar in the main ore body. This pillar was mined in January, 1922, which completed the mining of all available ore on this sub-level. There are several pillars left which are not available at this time, but which can be mined as soon as the water level is lowered ten feet or more.

4TH SUB BELOW 4TH LEVEL:

Mining was conducted on this sub throughout the year 1921 and also during 1922. It is one of the largest sub-levels opened on the Stephenson property. The first of the year the greater part of the product was obtained from this sub-level; this continued until in May, after which the product decreased.

In 1921, approximately 50% of the available ore was mined. In 1922, the remaining ore was mined, except four small pillars on the footwall. It is estimated that there are 6,267 tons of available ore remaining on this sub-level. There is also at least 20,000 tons which is not available until the water level is lowered. At the end of the year there were three contracts mining the small pillars which had been left on the footwall.

FIFTH LEVEL.

The mining of ore under the hanging on this level was started the latter part of the year 1921. As mining was completed on the sub-level above, the contracts were moved to the 5th Level, until by June, 1922, the greater part of the product was being obtained here. All the ore mined here has been handled through raises from the 6th Level, which resulted in the transfer of haulage operations from the 5th to the 6th Level.

Much repair work has been necessary in the 5th Level drifts during the past year. During the time that the mine was idle in August, on account of changing over the skip hoist from steam to electric, extensive repairs were made in the North-East haulage drift.

The ore area on the 5th Level has proven to be somewhat smaller than was anticipated. This is due to irregularities in the hanging, which eliminated some areas which had previously been considered as part of the ore body. Several pillars have to be left on the 5th Level in areas where there is danger from water; these will be available as soon as the water is lowered from 40 to 50 feet.

1ST SUB BELOW 4TH LEVEL:

A few rock drifts were driven on this sub-level in 1921, for timber roads. One other timber road was made in February, 1922; no other work was done until in July, when two contracts started opening this sub-level. As mining was completed under the hanging on the 5th Level, more contracts were moved here, until by the end of the year there were seven gangs working. Mining has been started under the hanging on the North-East side of the ore body in a territory approximately 500 feet in length. The outlining of the ore under the hanging, which has been practically completed on this side of the mine, has shown a further decrease in the size of the ore body. The actual area as compared with the 5th Level shows a decrease of from 20 to 30%.

In December, three contracts started outlining the ore under the hanging near the Stephenson boundary line on the South-West side of the ore body.

2ND SUB BELOW 5TH LEVEL:

There was some rock drifting on this sub-level during the past year to provide timber roads. Near the end of the year the work of opening this sub-level under the hanging was started in the center of the ore body. It is planned to mine and cave a small area here to get the water to come in on this sub-level, so as to make the sub-level above more dry. Additional irregularities in the hanging were disclosed by the work which has been done here.

4TH SUB BELOW 5TH LEVEL:

There was approximately 300 feet of ore drifting on this sub-level under the hanging in the approximate center of the trough near the C. & N. W. Ry. Co. Lease, Section 29. This work was done in conjunction with the outlining of the hanging on the C. & N. W. Lease, Sec. 29. The hanging is very flat in the center of the trough so that it will be possible to mine the ore here without interference with operations on the sub-levels above.

5TH SUB BELOW 5TH LEVEL:

There was 100 feet of ore drifting on this sub-level, outlining the footwall of the ore body which was discovered in 1921, on the 6th Level. Work on this sub-level, which is 20 feet above the 6th, was started in 1921, and completed early in 1922. It was done in order to determine the correct location of a haulage road which must be driven on the 6th Level in order to mine the ore above the level. This ore body will be available for mining when the water level has been lowered 50 feet.

SIXTH LEVEL.

The development of the 6th Level was continued during the past year. There was a total of 565 feet of rock drifting and 120 feet of ore drifting done here during 1922. No. 2 crosscut was completed, and only 15 feet of drifting has to be done to complete No. 3 crosscut. There is 80 feet of drifting required to complete No. 4 crosscut. There is approximately 500 feet of rock drifting to be done to complete the development of the ore body found in 1921 at the South-East end of the 6th Level. There is a total of 595 feet of rock drifting to be done on the 6th Level to complete the development drifts on this level.

There was 120 feet of ore drifting in the ore body discovered on the 6th Level in 1921, this drift being driven to the hanging near the South-East end of the ore body in order that some diamond drilling might be done to find the depth of the ore below the 6th Level. Two holes were drilled, one vertical and one on an angle which gave the information necessary to enable a more accurate estimate to be made of the ore below the 6th Level. This information was also needed in order to plan the levels to be opened from the auxiliary shaft on Section 29, which will be used for mining the ore below the 6th Level on both the Stephenson and Section 29 Leases.

During the past year five raises that were started in 1921, were completed through to the 5th Level, or to the 1st sub above the 5th. Seven raises were started in 1922 and completed. The majority of these raises were located in No. 2 crosscut and in the North-East haulage drift. In December, 1922, there were two raises being put up in No. 2 crosscut near the center of the trough. In order to completely develop the entire Stephenson ore body at least forty additional raises will be required. These raises will vary in length from 50 to 100 feet.

C. & N. W. LEASE - SECTION 29.

The product for the year was as follows:

Northdale, 7,089 tons.

The 1922 shipments, and balance on hand December 31st, 1922 is as follows:

	<u>SHIPMENTS</u>	<u>BALANCE ON HAND</u>
Northdale,	1,942	7,104

The estimated ore in sight December 31st, 1922 was as follows:

	<u>NORTH BESSEMER</u>	<u>NORTH- WESTERN</u>	<u>NORTHDALE</u>	<u>TOTAL</u>
Developed ore above 5th,	5,700	1,900	15,603	23,203
" " " 6th,	4,000	4,000	36,766	44,766
Total Developed Ore,	9,700	5,900	52,369	67,969
Prospective Ore below 6th,	25,000	25,000	111,642	161,642
Grand Total,	34,700	30,900	164,011	229,611

The estimated tonnage in mine, sub-divided as required by the Tax Commission, is as follows:

Bessemer Ore:

Developed,	1. North Bessemer,	9,700 tons
Prospective,		<u>25,000</u> "
Total Bessemer Ore,		34,700 tons

Non-Bessemer Ore:

Developed,	1. Northwestern,	5,900 "
	2. Northdale,	<u>52,369</u> "
		58,269 "
Prospective,	1. Northwestern,	25,000 "
	2. Northdale,	<u>111,642</u> "
		136,642 "
Total Non-Bessemer Ore,		<u>194,911</u> "
Grand Total,		229,611 "

As a result of the development work done in 1922, it has been

possible to make an accurate estimate of the ore above the 6th Level. It has been definitely proven that there is a barren area 300 feet in length between the main ore body, located near the point where the water came in in 1917, and the ore body shown up by surface diamond drilling farther to the South-East.

Two sub-levels were mined in 1922 at the top of the South-East ore body, giving valuable information both as regards tonnage above and below the 6th Level. The ore below the 6th Level has been estimated from a number of cross-sections, the old surface diamond drill holes, together with the development work at the top of this ore body, just above the 6th Level. The information is necessarily incomplete due to the absence of development work below the 6th Level, but it is believed the new estimate closely represents the actual tonnage in this territory.

The development work done in 1922 in the ore body found in 1921 on the Stephenson Lease indicated that this ore extended onto the C. & N. W. Ry. Co., Lease, Section 29. A number of cross-sections were made through this territory from which was figured the probable tonnage of this ore body. It is not thought that this ore connects with the South-East ore body due to a rise in the footwall between them.

The probable ore below the 6th Level is, therefore, in two separate bodies, the South-East ore body contains 138,432 tons and the new ore body, several hundred feet to the East, 23,210 tons. All the ore above the 6th Level is considered as developed ore this year and in this area there is only 67,969 tons of which 44,766 tons are between the 6th and 5th Levels and 23,203 tons above the 5th Level.

Due to lack of information, the estimates in previous years were made by deducting the ore mined from the original estimate of ore on the lease, figured from surface diamond drill holes. The estimate

of 1921 made up in this way showed 388,304 tons developed and probable ore on the lease; this years estimate shows 228,711 tons, or a decrease of 159,593 tons.

In former years the Tax Commission have used a figure of 500,000 tons on this lease, which they estimated from the surface diamond drill holes. Owing to the small amount of development work on this property it has been impossible to present a convincing argument for a reduction in their tonnage. This year more information is available, and it is hoped they can be induced to lower their estimate to correspond with actual conditions disclosed by the development work of the past year.

Only a small tonnage of ore was mined on this property during the past year. Mining started in May and continued until the last of November, since which time there has been no production from this lease. Two sub-levels were mined out at the top of the South-East ore body, near diamond drill hole No. 40. There is so much water over-lying the ore body at this point that it was not considered advisable to mine another sub-level on account of the danger of caving the capping, which would permit water to enter the mine and probably cause another flood. Mining on this lease must, therefore, be done in new territory below the 6th Level until such a time as the water level is lowered sufficiently to permit of work to be resumed in the developed ore above the 6th Level. Preparations are under-way for sinking an auxiliary shaft on this lease and it will be sunk and new levels developed in 1923.

During the past year work has been done at the following points:

3RD SUB BELOW FIFTH LEVEL
4TH SUB BELOW FIFTH LEVEL
5TH SUB BELOW FIFTH LEVEL
SIXTH LEVEL.
WATER RAISE AND SUB-LEVEL NEAR #66 DRILL HOLE.

3RD SUB BELOW 5TH LEVEL:

In the early part of the year a raise was put up a distance of 56 feet in rock above No. 5 crosscut, at a point near the Stephenson boundary line. A sub-level was opened 48 feet above the 6th, or at the elevation of the 3rd sub-level below the 5th Level, and a drift driven 80 feet to the East. This drift passed through several seams of ore from 1 to 3 feet in thickness, but did not encounter any merchantable ore. From information gained from other raises and sub-levels, it seemed evident that there was no ore in this territory. Exploratory work has been temporarily abandoned, but will be taken up again if developments warrant.

4TH SUB BELOW 5TH LEVEL:

This sub-level has been opened in two separate ore bodies on the C. & N. W. Lease. In the downward extension of the ore body near the Stephenson boundary line, which is the ore body where the water came in that drown out the mine in 1917, and which is hereafter termed the North-West ore body, there was approximately 160 feet of ore drifting under the hanging. The work done here showed that the ore did not extend far enough to the East to permit of mining under the hanging without undermining the ore body on the sub above, which had been fully developed for mining in 1921. The ore body pinches out just below the 4th sub level. There is only a small tonnage on the 4th sub-level, all of which is now unavailable. This sub-level was also opened at another point approximately 300 feet South-East of the North-West ore body from a raise put up from No. 5 crosscut. It was opened in a separate ore body from the ore described in the preceding paragraph; it is hereafter called the South-East ore body.

It extends below the 6th Level and contains the greater part of the ore remaining on this lease. The area on this sub-level was much smaller than was anticipated, being approximately 80 feet long by 30 feet wide. The ore mined here averaged about 57.00% Iron due to seams of jasper in the ore. The enrichment was not complete and it is probable that this sub-level was opened too near the hanging. Mining was finished here in the fall, and the contracts dropped down 12 feet and opened the 5th sub-level.

5TH SUB BELOW 5TH LEVEL:

There was 100 feet of drifting on this sub-level in the North-West ore body near the Stephenson boundary line. This drift was driven 60 feet in rock and 40 feet in ore near No. 32 diamond drill hole from surface. This drill hole showed 6 feet of ore at the approximate elevation of this sub-level. There is apparently a very small area of the ore body which extends down to the elevation of this sub-level. It is almost directly under the ore above, so that it was not advisable to develop it at this time. Sufficient work was done here to prove that there was a barren area on the C. & N. W. Lease, approximately 300 feet in length between the North-West and the South-East ore bodies.

In the South-East ore body, which lies 300 feet from the ore body described in the previous paragraph, a sub-level was mined out. The contracts started work on this sub after they had completed work on the sub above, which was the top of this ore body. Results here were very disappointing due to the fact that the ore had an area of only 70 feet by 30 feet; the enrichment was also irregular, with seams of chert and jasper in the ore. The ore produced from this sub-level has not averaged over 57.00% Iron, the same as on the sub above. The hanging over the two sub-levels opened in the South-East ore body is

very soft, and caves as soon as the ore is removed. For this reason it was not considered advisable to conduct further mining operations at this time, due to the danger of the cave extending through to the sand. There is a heavy over-burden of quick-sand above this territory, and any crack or cave to the ledge would let in a large quantity of water and might flood the mine.

SIXTH LEVEL.

No. 5 crosscut was started from the South-West haulage drift in 1921; in 1922 it was extended 123 feet in rock. Three raises were put up from this crosscut in 1922, one being extended to the 3rd sub below 5th Level and the other two to the 4th sub below the 5th Level.

In September, a drift to the site of the auxiliary shaft was started from the South-East haulage drift. It was driven a distance of 100 feet to the South-West of the haulage drift in the footwall on the South side of the ore body. The auxiliary shaft, which it is planned to put down from this drift, is located 330 feet South of the Stephenson boundary line, approximately 2,100 feet South-East of the Stephenson shaft, measured along the line of the haulage drift. The drift for the new shaft has been driven 60 feet beyond the site of the shaft. At the end of the year they were widening the end of this drift for the engine house. The hoist from the Crosby Mine has been purchased and it will be installed as soon as the engine room is finished. The shaft will extend 60 feet above the level to provide room for handling dirt, and will be sunk to a depth of about 125 feet below the level. On account of the flat pitch of the ore body it is planned to make two levels, approximately 60 feet apart. In addition to the

above drift, a raise was put up on the side of the main haulage drift, which will be used for transferring the ore hoisted from the auxiliary shaft to motor cars. This raise has a capacity of about 30 motor cars, and has two compartments for handling two grades of ore.

WATER RAISE

SUB LEVEL NEAR #66 DIAMOND DRILL HOLE.

The latter part of 1921 it was decided to put up a raise near No. 66 diamond drill hole to a point approximately 50 feet beneath the ledge, at which point a sub-level was to be opened from which it was hoped to be able to open No. 66 diamond drill hole; also to drill other holes up to the ledge so that from 2,000 to 3,000 gallons of water per minute could be brought into the mine under control. The raise was continued in 1922, being completed in March, to an elevation of 190 feet above the 6th Level, or within 50 feet of the ledge. A sub-level was then opened, and in May a diamond drill was brought here. A total of three holes were put up to the sand, these holes being respectively, 46', 45' and 46'4" in height. The results were very disappointing, as the holes quickly blocked with sand and gravel, preventing the water from entering the mine. A pipe with weinbore on the end was put up in the last hole drilled, a distance of 4 feet in the sand and gravel. About 50 gallons of water per minute came through this pipe. An effort was also made to re-open and clean out diamond drill hole No. 66. Several hundred pounds of steel pipe was taken out of the hole, as also several boulders, but it was found impossible to keep the hole open, and the work was abandoned.

As it seemed impossible to obtain water by diamond drill holes, it was decided to extend the sub-level beyond No. 66 diamond drill hole and endeavor to obtain water by putting up a number of raises near surface and then break the small amount of ground remaining in the back of the raises, so as to make a hole 2 or 3 feet in diameter directly through to the sand and gravel. It was planned to seal off the territory where these raises were located by putting in a concrete dam in the sub-level

drift. Six inch drain pipes were to be put through the dam with valves on the end, so as to control the water. These pipes were then to be extended inside the dam and a distance of 20 feet up the raises, the upper 10 or 15 feet of the pipes were to be drilled full of small holes to form a weinbore. Just above the top of the pipes it was planned to cut hitches, and put in rails, which would hold the dirt which was broken in the blast, at a point above the weinbore. It was thought that this would form a screen to hold back the coarse sand and gravel which would establish conditions necessary to obtain a free flow of water. This work was carried out as planned, a total of five raises being put up to a point within 10 or 12 feet of the ledge. A concrete dam was installed in the sub-level drift in November, and all preparations made for blasting the remaining rock in the backs of the raises. They were blasted on November 28th, but no water came. After waiting a few days, the plug in the dam was removed, which opened a passage-way to the drift under the raises. The rails in the raises, 20 feet above the floor of the drift were covered with broken dirt. The rails in four raises were then blasted out, which permitted the dirt to fall out of the raises in to the drift. Ladders were installed in the raises and an inspection made to determine the effects of the blast. In one raise there was a hole about 18" in diameter through to the sand; there was only a little water dripping from the sand and gravel. One of the other raises had broken within 7" of the ledge; the other two had about 6 feet of solid ground in the back which had not been broken by the blast. All loose dirt in the raises was then cleaned out, ladder roads installed, and the last of the month the work of drilling more holes in three of the raises was started. In two of the raises, holes have been drilled through to the sand; these holes being approximately 7 feet in length. In order to prove whether there was a hardpan holding the water back just above the ledge, a drill was pushed through one of these holes into the sand a distance of about 12 feet. There was no

more resistance to the passage of the drill than would be expected when pushing it through a fairly compact mass of sand and gravel. Apparently the bottom of the deep basin on Section 29 is filled with a compact mass of fine quick-sand, gravel and boulders, with possibly a little hardpan just above the ledge. It was thought possible that at some point in the sand and gravel a more open water course might be found. It was, therefore, decided, the last of the month, to push a 1-1/4" pipe, with weinbore on the end, as far as possible up through the sand to determine if water could be found at any point within a reasonable distance. This work was under-way at the end of the year. If this pipe will carry water under pressure, 20 to 30 pipes would carry the required amount of water, i. e., 2,000 to 3,000 gallons per minute.

If this scheme proves unsuccessful, the tops of the raises will be blasted again, which will open holes to the sand five or more feet in diameter. Whether the sand and gravel will cave into the raise, and sufficient water enter (from 2,000 to 3,000 gallons per minute) is, of course, a problem which can only be solved when the work is done.

The necessity of gaining control of the water is increasing due to the fact that the area of the ore body on the Stephenson lease is decreasing with depth; also to the fact that there is no production being obtained from the C. & N. W. Lease, Section 29. At the present time there is not more than 75 gallons per minute entering the mine from the raises and drill holes. As stated before, there should be at least 2,000 and possibly 3,000 gallons per minute entering the mine at this point, which would increase the speed of lowering the water level so that areas unavailable for mining would soon be available. It is true that the water level is being gradually lowered in the entire territory above the Stephenson and Section 29 ore bodies. The rate of lowering, however, is slowing up and will not lower the water within

the period necessary to permit of mining the ore.

The expense of this work in 1922 has been approximately \$8,000.00, and the problem has not yet been solved. Apparently it will be necessary to continue this work for some time in 1923, for the present plans may fail and a different method have to be adopted. If the present plans to get the water into the mine through the raises is unsuccessful, it would appear that the only other feasible method would be that of stoping out a considerable area above the sub-level, such area might even possibly be 50 feet square, then blasting through to the sand. It is possible that caving a large area would create a condition similar to that existing at the point where the water now enters the mine. It may eventually be necessary to break through the ledge at several other points in order to get sufficient water. This work must be continued until it is definitely proven whether it can be made successful. If unsuccessful, the life of the Stephenson and Section 29 ore bodies is limited, as large pillars must be left to support the capping.

DIAMOND DRILLING

Underground Hole No. 1 was drilled on the Stephenson Lease in April, on the 6th Level, to prove up the downward extension of the ore body found in 1921 near the C. & N. W. boundary line. This hole showed the ore to extend 40 feet below the level.

Hole No. 2 was drilled from the same station on a dip of 45°, it passed through 40 feet of Bessemer ore into ferruginous slate. The arkose foot was encountered at a depth of 100 feet, the hole being stopped 120 feet below the 6th Level.

The drill was then moved to Section 29, near No. 66 diamond drill hole on the sub-level 50 feet below ledge, where three holes were drilled through the ledge. In August, a hole was drilled on the 6th Level, about 100 feet West of surface Diamond Drill Hole No. 42. This hole encountered ore at a depth of 95 feet, in which it continued to 117 feet, at which point drilling had to be abandoned due to the hole caving. The 22 feet of ore encountered in this hole averaged 57.91% Iron, .030 Phosphorus. It had been planned to continue this hole to the arkose and thus get information as to the thickness of the ore body at this point. Information concerning this ore body was sought in order to plan the levels to be opened below the 6th Level from the auxiliary shaft on Section 29.

In concluding the report on the Stephenson Mine, attention is directed to the extraordinary items of expense incurred during the year 1922. In the order of their importance these were: first, the expense incurred in changing over the skip and cage hoist from steam to electric; second, the expense of work done to gain control of the water overlying the ore body. These two items increased the cost of the ore approximately 15¢ per ton. Consideration must also be given

to the pumping cost at this property of over 18¢ per ton, and to the cost of rock drifting, which was nearly 8¢ per ton. These four items taken together amount to 41¢ per ton, or 16% of the cost on cars and should be given consideration in comparing the cost of ore at this property with the cost at other mines.

STEPHENSON SURFACE.

In January, five bents were erected on the C. & N. W. stocking trestle. As there was very little ore produced from this lease, this trestle was extended and used for stocking "Stephenson Ore". The Stephenson ore trestle, as also the Bessemer trestle, were dismantled when shipping started in the summer. When shipping ceased in the fall the work of erecting trestles was started and owing to the fact that shipments had not been completed from the piles, the expense was greater than usual for this work. In order to provide stocking grounds for the "Stephenson" ore it was decided to erect another trestle to the East of the Stephenson pile. On this trestle there were seven permanent bents and 27 stocking bents erected. Another trestle was also erected on top of the old "Stephenson" pile, part of which had been shipped, on a 1% up-grade from the end of the permanent trestle. This will permit of stocking a considerable amount of ore to fill that portion of the pile which was removed this year, and also in raising the height of the pile. The Bessemer trestle was also re-erected in the fall, a total of fifteen bents being put up.

The top tram shanty, housing the rock puffer which handles the rock, was repaired, a new roof being put on and the sides of the house covered with rubberoid roofing.

Considerable work was done in the shaft house in the fall due to the installation of counter-balance on the cage hoist. The accident of August 21st, when the skip was over-wound, the rope breaking and the skip falling to the bottom of the shaft, in which accident the head sheave was broken, necessitating the installation of a new sheave at the top of the shaft house. Two wood lined sheaves were

on hand at the Gwinn Mine. These had been purchased shortly before the mine closed down and had not yet been installed. One of these was put on top of the shaft house to replace the sheave broken by the accident of August 21st; the other one was installed a short time later, as a crack developed near the hub of the other skip sheave. The installation of counter-balance for the cage made it necessary to put another sheave on top of the shaft house and also change the position of the cage head sheave.

The position of the cage rope sheaves on the pulley stands was changed, as the cage rope which formerly left the top of the drum of the hoist was changed so that it came off the bottom of the drum. This made it necessary to lower the sheaves on the pulley stands. The installation of counter-balance made it necessary to install an 8-ft. sheave on the ground about 100 feet in front of the engine house in order that the rope might be lined up properly with the counter-balance pipe.

The major surface work of the year as regards expense was incurred in changing the skip and cage hoists from steam to electric. Due to an error made in calculating the size of the pinion on the motor shaft of the skip hoist, there was not sufficient power to hoist a loaded skip. While waiting for a new pinion, the hoist was operated by using one skip as a counter-balance. It was while operating in this way that the skip was over-wound, causing the accident of August 21st. After this accident two brakemen handled the skips until the new pinion was installed, one operating the hand brake, the other the safety brake.

When the cage hoist was changed from steam to electric it was found that it was impossible to control it without having a man on the hand brake, as also the safety brake. This was over-come by installing the counter-balance. This work was further delayed by a

mistake made in the castings for the counter-balance which had to be returned to the Lake Shore Engine Works and new ones cast. During this time a number of brake bands were worn out on the cage hoist, causing an extra expense for replacement. The mistakes made in figuring the equipment needed for making the change, increased the expense of the work materially.

The condensed water from the heaters in the dry have heretofore been discharging into a launder which connects with the launder carrying the water from the pumping plant. Late in the fall it was decided to put a return system in whereby this water would be returned to the boiler. Trenches for the pipe lines were dug and launders made, but the work was not completed at the end of the year due to delay in the arrival of pipe ordered for this work. The elevating traps used at the Gwinn Mine have been taken out, brought to the Stephenson, and will be used here.

During the year the timber yard was thoroughly cleaned, all chips and bark being burned or removed, as also all the lagging piled. A track has been laid at the lower edge of the timber yard so that timber from the skid-ways can be trammed to the timber tunnel; heretofore, part of this timber had to be teamed.

STEPHENSON MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Stephenson Bess.,	62.14	.051	3.46	-
Stephenson #1,	63.41	.075	2.61	1.188
Stephenson,	60.60	.280	3.98	1.110
Stephenwood,	(No Production)			
Northdale,	58.37	.127	7.71	1.125

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Stephenson Bess.,	(All Mixed)			
Stephenson #1,	(All Mixed)			
Stephenson,	(All Mixed)			
Stephenwood,	(All Mixed)			
Northdale,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1922.

	STEPHEN- SON BESSEMER	STEPHEN- SON ORE	STEPHEN- SON NO. 1	STEPHEN- WOOD	NORTH- DALE	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1922,	64,157	114,647	-	48,903	1,957	229,664	110,202
Output for Year,	31,821	160,313	-	-	7,089	199,223	196,539
Transferred,	15,894	7,681	8,213	-	-	-	-
Stockpile Overrun,	-	-	-	14,000	-	14,000	-
Total,	80,084	282,641	8,213	62,903	9,046	442,867	306,741
Shipments,	66,543	77,016	8,213	48,808	1,942	202,522	77,077
Balance on Hand,	13,541	205,625	-	14,095	7,104	240,365	229,664
Increase in Output,						16,684	
Increase in Ore on Hand,						10,701	

1922 -- 2-4 Hour Shifts, Jan. 1st to June 4th, 1922.
1-8 Hour Shift, 6 days per week, June 5th to Dec. 31st, 1922.

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
1-8 Hour Shift, 5 days per week, March 26th to June 1st, 1921.
2-4 Hour Shifts, 6 days per week, June 1st to Dec. 31st, 1921.

STEPHENSON MINE

SHIPMENTS FOR YEAR 1922.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Stephenson Bessemer,	7,762	58,781	66,543	-
Stephenson No. 1,	3,337	4,876	8,213	-
Stephenson,	45,582	31,434	77,016	56,828
Stephenwood,	-	48,808	48,808	96
Northdale,	1,942	-	1,942	20,153
Total,	58,623	143,899	202,522	77,077
Total Last Year,	24,832	52,245	77,077	
Increase,	33,791	91,654	125,445	

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STEPHENSON MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	213,223	196,539	16,684	
Underground Costs	1.236	1.706		.470
Surface Costs	.367	.283	.084	
General Mine Accounts	.160	.205		.045
Cost of Production	1.763	2.194		.431
Original Cost		.001		.001
Plant Account	.040	.028	.012	
Equipment		.001		.001
Uncompleted Construction	.002	.004		.002
Taxes	.104	.123		.029
Central Office	.074	.077		.003
Contingent Expense	.010	.009	.001	
Cost Adjustment	.047	.100		.053
Cost on Stockpile	2.040	2.537		.497
Loading & Shipping	.060	.052	.008	
Total Cost on Cars	2.100	2.589		.489
No. Days Operating	293	293		
No. Shifts & Hours	2-4-129 1-8-164	1-8-115 2-4-178		
Avg. Daily Product	728	671	57	
<u>COST OF PRODUCTION</u>				
Labor	.922	1.348		.376
Supplies	.791	.846		.055
Total	1.763	2.194		.431

STEPHENSON MINE
STEPHENSON MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1922.
COMPARATIVE WAGES AND PRODUCT

	1922	1921	INCREASE	DECREASE
PRODUCT	213,223	196,539	16,684	
No. Shifts and Hours	2-4;1-8	(a) 61	824.62	182.16
AVG. NO. MEN WORKING	72,222	.0275	1,988.10	3,332.78
Surface	44	43	1	
Underground	76,159	.062178	4,725.51	4,082.84
Total	203	221		18
AVG. WAGES PER DAY	26,292	.0905	2,381.09	5,447.56
Surface	3.88	4.64		.76-16.4%
Underground	12 4.30	12 5.29	1,567.39	.99-18.9%
Total	4.19	5.14		.95-18.5%
WAGES PER MO. OF 25 DAYS				787.10
Surface	97.00	116.00		19.00
Underground	107.50	132.25	11,286.71	19,672.47
Total	104.75	128.50		23.75
PRODUCT PER MAN PER DAY	197.20	.082	17,682.30	
Surface	17.84	18.18		.34
Underground	6.00	5.14	.86	
Total	4.49	4.01	.48	
LABOR COST PER TON			1,282.12	4,222.12
Surface	.218	.255		.037
Underground	.716	1.029	2,852.12	.313
Total	.934	1.284		.350
AVG. PRODUCT BRK'G & TRM'G	9.76	8.58	1.18	
" WAGES CONTRACT MINERS	4.45	5.56		1.11
" " " TRAMMERS				
" " " LABOR	4.45	5.56		1.11
TOTAL NO. OF DAYS	11950 1/2	10811	1,139 1/4	
Surface	35519	38231		2,712
Underground	47469 1/2	49042		1,572-3/4
Total				
AMOUNT FOR LABOR				
Surface	46393.25	50186.97	199,223	3793.72
Underground	152671.40	202297.69	1,132	49626.29
Total	199064.64	252484.66	4,283	53420.01

Proportion Surface to Underground Men:

1922 - 1 to 3.62
1921 - 1 to 4.14
1920 - 1 to 3
1919 - 1 to 1
1918 - 1 to 2.9

No mining done during 1918 and 1919
on account of mine being flooded.

Cost for timber, lagging & poles - 1922

1921
1920
1917
1916
1915
1914
1913
1912

(a) 1-8hr 6 days a week Jan.1 to Mar 26;
1-8hr 5 " Mar, 27 to May 31;
2-4hr 6 " June 1 to Dec. 31, 1921.
1922.
1-8hr basis June 5, 1922.

STEPHENSON MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1922.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT	
			1 9 2 2	1 9 2 1
4" to 6" Timber	38,908	.0161	624.62	182.16
6" to 8" "	72,222	.0275	1,988.10	3,332.78
8" to 10" "	76,080	.0621	4,725.51	6,082.84
10" to 12" "	26,292	.0905	2,381.09	5,447.56
12" to 14" "	12,134	.1292	1,567.39	3,865.86
14" to 16" "				787.10
Total - 1922	225,636	.05002	11,286.71	19,698.30
Total - 1921	199,280	.0988	19,698.30	
	LINEAL FEET	PER 100*		
5' Lagging	437,750	.7682	3,363.10	4,219.54
8' "	415,480	.711	2,970.40	4,333.82
Total Lagging	853,230	.7423	6,333.50	8,553.36
Poles	450	1.150	5.89	621.40
Total Lagging & Poles, 1922	853,680	.7422	6,339.39	9,174.76
" " 1921	905,690	1.013	9,174.76	9,174.76
5/8" Covering Bds(ft)	38,497	1.268	488.39	411.75
Product			199,223	196,539
Feet of timber per ton of ore			1.132	1.013
" lagging "			4.283	4.354
" " per foot of timber			3.781	4.294
Cost per ton for timber			.0566	.1002
" lagging			.0318	.0435
" poles			.00002	.0032
" covering boards			.0025	.002
" timber, lagging, poles & bds			.09092	.1469
Equivalent to stull timber to bd.measure			385,869	441,230
Feet bd.measure per ton of ore			1,937	2.244

Cost for timber, lagging & poles - 1922	17,626.10
1921	28,873.06
1920	24,996.50
1917	14,089.63
1916	16,540.20
1915	9,643.88
1914	12,362.13
1913	16,053.54
1912	11,897.82

Mine worked 3 days per wk. Jan. 1 to June 5, 1922 - 1 shift

STEPHENSON MINE. 6 " June 5 to Dec. 31, 1922, 1 "#

STEPHENSON MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICE	AMOUNT 1922	AMOUNT 1921
40% Powder	19,950	.1377	2,875.20	2,279.48
50% "	23,150	.1524	3,527.69	4,093.39
60% "	2,710	.1752	474.94	1,369.53
Total Powder	45,810	.1501	6,877.83	7,742.40
Fuse	188,800	.748	1,412.54	1,550.60
Caps	40,000	1.158	463.25	565.38
Cap Crimpers	24	.502	12.05	15.93
Tamping Bags	9,500	.216	20.53	25.16
Total Fuse, Etc.			1,908.37	2,157.07
Total All Explosives			8,786.20	9,899.47
Product			199,223	196,539
Pounds Powder per ton of Ore			.225	.220
Cost Per Ton for Powder			.0345	.0394
" Fuse, Etc.			.1009	.0109
" All Explosives			.0441	.0503
Avg. Price per Lb. for Powder			.1501	.1788

Mine operated 3 days per week Jan.1 to June 5, 1922, 1 shift.
 " " 6 " " June 5 to Dec.31, 1922, 1 shift.

PRINCETON MINE.

SURFACE:

There was practically no surface work done at the Princeton Mine, with the exception of the work necessary for loading out ore shipped from stockpile in the summer, until late in the Fall, when it was decided to change over the hoisting plant from the old engine house to the new engine house. This entailed moving the motor and electrical equipment and changing the hoisting ropes from the old hoist to the new. It was also necessary to lower the pulley stands as the new engine house is located about 60 feet nearer the shaft. In addition to the above work, the engine house was wired for lights and a brick chimney built. A heating stove was installed, so that the building could be heated. This work was completed early in December.

UNDERGROUND:

During the first four months of the year there was a mining captain and three timbermen working underground at the Princeton Mine on alternate days. When full time was resumed in June, the Captain took charge of operations at the Austin Mine, where he has since spent most of his time. Three timbermen have worked full time underground at the Princeton, as there has been a large amount of repair work necessary. The drift on 6th Level from No. 2 towards No. 1 shaft on Sections 18, 19 and 20, has been repaired during the year. The timber in about 300 feet of this drift had crushed to such an extent that it was necessary to install new timber. Some ore was obtained from this work, as well as rock. Considerable repairs have also been

necessary near No. 3 shaft territory on both the 5th and 6th levels.
When operations are resumed at this property it will be necessary to
re-open the sub-levels, as it is impossible to keep them open when the
mine is idle.

PRINCETON MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Princeport,	(No Production)			
Cambridge,	61.89	.664	2.88	1.317

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	Mine			
	IRON	PHOS.	SILICA	MANG.
Princeport,	(No Shipments)			
Cambridge,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1922.

	PRINCE- PORT	SEC. 19 PRINCE- PORT	CAMBRIDGE	SEC. 19 CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1922,	9,160	1,313	206,199	26,788	243,460	170,226
Output for Year,	-	-	74	-	74	97,150
Transferred,	-	-	3,005	3,005	-	-
Total,	9,160	1,313	209,278	23,783	243,534	267,376
Shipments,	-	-	26,145	-	26,145	23,916
Balance on Hand,	9,160	1,313	183,133	23,783	217,389	243,460
Decrease in Output,					97,076	
Decrease in Ore on Hand,					26,071	

1922 -- Mine Idle during Year.

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
 1-8 Hour Shift, 5 days per week, Mar. 26th to June 1st, 1921.
 1-4 Hour Shift, 6 days per week, June 1st to Aug. 26th, 1921.
 Mine closed Aug. 26th, 1921.

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PRINCETON MINE
SHIPMENTS FOR YEAR 1922.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Princeport,	-	-	-	4,461
Sec. 19 Princeport,	-	-	-	607
Cambridge,	-	26,145	26,145	16,748
Sec. 19 Cambridge,	-	-	-	2,100
Total,	-	26,145	26,145	23,916
Total Last Year,	4,274	19,642	23,916	
Increase,			2,229	

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PRINCETON MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	74	97,150		
Underground Costs		1.862		
Surface Costs		.418		
General Mine Accounts		.223		
Cost of Production		2.503		
Original Cost		.316		
Plant Account		.053		
Uncompleted Construction		.015		
Taxes		.149		
Central Office		.080		
Contingent Expense		.009		
Idle Expense		.261		
Cost Adjustment		.103		
Cost on Stockpile		3.489		
Loading & Shipping		.019		
Total Cost on Cars		3.508		
No. Days Operating		189		
No. Shifts & Hours		1-8hr-115 1-4hr- 74		
Avg. Daily Product		514		
COST OF PRODUCTION				
Labor		1.581		
Supplies		.928		
Total		2.503		

NOTE: 1921 - 1-8hr 6 days a week to Mar.26;
 1-8hr 5 " " May 31;
 1-4hr 6 " " June 1 to Aug.27;
 Idle - Aug.28th to Dec.31st.
 1922 - Not operated.

PRINCETON MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
Product	74	97,150		97,076
No.Shifts & Hours		1-8;1-4		
AVG.NO. MEN WORKING				
Surface	3	32		29
Underground	6	90		84
Total	9	122		113
AVG.WAGES PER DAY				
Surface	3.99	4.80		.91-19%
Underground	4.55	5.37		.82-15.2%
Total	4.29	5.37		1.08-20%
WAGES PER MC. OF 25 DAYS				
Surface	99.75	120.00		20.25
Underground	113.75	139.25		25.50
Total	107.25	134.25		27.00
PRODUCT PER MAN PER DAY				
Surface		13.24		
Underground		4.73		
Total		3.48		
LABOR COST PER TON				
Surface		.362		
Underground		1.179		
Total		1.541		
AVG.PRODUCT BK'G & TRM'G		7.46		
" WAGES CONTRACT MINERS		5.96		
" " "		5.96		
TOTAL NO. OF DAYS				
Surface	1,159 $\frac{1}{4}$	7333- $\frac{3}{4}$		6174 $\frac{1}{2}$
Underground	1,387 $\frac{1}{4}$	20544- $\frac{1}{4}$		19157
Total	2,546 $\frac{1}{2}$	27878		25331 $\frac{1}{2}$
AMOUNT FOR LABOR				
Surface	4628.70	35207.36		30578.66
Underground	6312.03	114506.03		108194.00
Total	10940.73	149713.39		138772.66

Proportion Surface to Underground Men:

1922 - 1 to 2.
 1921 - 1 to 2.81
 1920 - 1 to 3.1
 1919 - 1 to 4.63
 1918 - 1 to 3.48

1921
 1-8hr 6 days a week to Mar.26;
 1-8hr 5 " " May 31;
 1-4hr 6 " " June 1 to Aug.27;
 Idle Aug.28th to Dec.31st.

1922.
 Not operating.

GWINN MINE.

SURFACE:

The ventilating fan for Gwinn and Francis Mines was installed in 1921 at the collar of the Gwinn shaft. It was not possible to hoist any ore or rock as the skips could not be used due to the location of the fan in one of the skip roads. The fan was moved in January, 1922 to the Francis Mine and installed underground. The skip roads were then re-opened at the Gwinn Mine, since which time ore and rock, encountered in re-timbering work, has been hoisted. In April, the entire timber yard at the mine was cleaned up. All the lagging was piled, and all bark and chips raked into piles and burned. The mine timber was cut during the summer, part of it being used at the Gwinn Mine and the balance taken to the Francis. All the old timber in stock had been used by the end of the year and a few cars of timber have been ordered.

The mine office building was painted in the summer. This building had had no paint for a number of years and needed it badly.

The sale of some Gwinn Silica ore made it necessary to install railroad tracks to the pile so that it could be loaded out. This ore was stocked from the side of the rock pile in the low ground near the old channel of the East branch. Some work was done in assisting the railroad to install the tracks to this stockpile. The greater part of the Silica ore was shipped during the summer and also all of the East stockpile of Gwinport and one cargo from the West stockpile.

It is estimated that there are 6,000 tons over-run in the East stock-pile.

Practically all warehouse supplies, as also pipe, square timber and plank were moved to the operating mines during the past year.

UNDERGROUND:

The timber on the 5th, 6th, 9th and 10th and 11th Levels have been kept in repair during the past year. There were four timbermen, besides the mine captain, employed underground, doing this work. There is also two pumpmen, making a total of seven men underground. These men, together with the hoisting engineer and surface foreman, constitute the force employed at this property. Attention has also been given to the timber on the sub-levels that were operating at the time the mine closed down, as well as the raises. All working places are in good condition, so that work can be resumed here on short notice.

GWINN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Gwinport,	58.30	.070	4.50	.275
Gwin Silica,	46.13	.438	21.55	.206

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	Mine			
	IRON	PHOS.	SILICA	MANG.
Gwinport,	(All Mixed)			
Gwin Silica,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1922.

	GWINNPORT	GWINN SILICA	TOTAL	TOTAL LAST YEAR
On hand January 1, 1922,	15,000	-	15,000	16,014
Output for Year,	21	14,064	14,085	42,999
Stockpile Overrun,	6,000	-	6,000	20,502
Total,	21,021	14,064	35,085	79,515
Shipments,	16,403	10,033	26,436	64,515
Balance on Hand,	4,618	4,031	8,649	15,000
Decrease in Output,			43,416	
Decrease in Ore on Hand,			6,351	

1922 -- Mine Idle during Year.

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
 1-8 Hour Shift, 5 days per week, Mar. 26th to June 1st, 1921.
 Mine closed May 31st, 1921.

GWINN MINE

SHIPMENTS FOR YEAR 1922.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gwinport,	-	16,403	16,403	64,515
Gwin Silica,	-	10,033	10,033	-
Total,	-	26,436	26,436	64,515
Total Last Year,	-	64,515	64,515	
Decrease,	-	38,079	38,079	

GWINN MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	20,085	63,501		
Underground Costs		1.296		
Surface Costs		.287		
General Mine Accounts		.142		
Cost of Production		1.725		
Plant Account		.577		
Extraordinary Drifting		.023		
Taxes		.104		
Central Office		.054		
Contingent Expense		.006		
Idle Expense		.514		
Cost Adjustment		.078		
Cost on Stockpile		3.081		
Loading & Shipping		.143		
Total Cost on Cars		3.224		
No. Days Operating		112		
No. Shifts & Hours		1-8hr		
Avg. Daily Product		433		
COST OF PRODUCTION				
Labor		1.128		
Supplies		.597		
Total		1.725		

1921 - 1-8hr 6 days a week to Mar. 26th;
 1-8hr 5 " " " May 31st;
 Idle from June 1st to December 31st.
 1922 - Not operated in 1922. 20,085 tons shown is Stockpile Overrun.

FRANCIS MINE.
GWINN MINE

The Francis Mine, COMPARATIVE WAGES AND PRODUCT basis until June 5th.

The miners worked alternate days, as	1922	1921	INCREASE	DECREASE
PRODUCT available to permit of obtaining a go	20,085	63,501		43.416
No. Shifts & Hours		1-8hr		
ing part of this period there was some work done on the night shift in				
AVG. NO. MEN WORKING				
Surface	5	15		10
Underground	8	38		30
Total	13	53		40
AVG. WAGES PER DAY				
Surface	4.04	4.74		.70-15%
Underground	4.44	5.53		1.09-19.6
Total	4.27	5.31		1.04-19.5%
WAGES PER MO. OF 25 DAYS				
Surface	101.00	118.50		17.50
Underground	111.00	138.25		27.25
Total	106.75	132.75		26.00
PRODUCT PER MAN PER DAY				
Surface		15.28		
Underground		6.04		
Total		4.33		
LABOR COST PER TON				
Surface		.310		
Underground		1:22		
Total				
AVG. PRODUCT BRK'G & TRM'G		10.70		
" WAGES CONTRACT MINERS		5.71		
" " "		5.71		
TOTAL NO. OF DAYS				
Surface	1413 1/2	4157		2743 1/2
Underground	2005 1/2	10515-3/4		8510 1/4
Total	3419	14672-3/4		11253-3/4
AMOUNT FOR LABOR				
Surface	5717.22	19696.52		13979.30
Underground	8897.25	58202.88		49305.63
Total	14614.47	77899.40		63284.93

operations, the product increased, averaging approximately 9,000 tons

Proportion Surface to Underground Men:

1922- 1 to 1.6
1921- 1 to 2.61
1920- 1 to 2.64
1919- 1 to 2.64
1918- 1 to 3.57

1921
1-8hr 6 days a week to Mar.26th;
1-8hr 5 " " May 31st;
Idle from June 1st to Dec.31st.
1922
Not operating. Product is stockpile
overrun with exception of 21 tons.

FRANCIS MINE.

The Francis Mine operated on half time basis until June 5th. The miners worked alternate days, as there were not enough working places available to permit of obtaining a good product on a 4-hour shift. During part of this period there was some work done on the night shift in order to speed up development work, but no ore was hoisted. The mine went on full time basis on June 5th, and continued to work one shift for the balance of the year. The last of the year there were a few gangs working night shift, doing development work.

The product by months for the year was as follows:

January,	7,525 tons	
February,	6,849 "	
March,	7,588 "	
April,	6,062 "	
May,	6,920 "	
June,	8,971 "	
July,	8,742 "	
August,	9,819 "	
September,	8,788 "	
October,	9,122 "	
November,	8,809 "	
December,	<u>9,054</u> "	
Total Ore,		98,049 tons
Rock,		<u>10,200</u> "
Total Ore and Rock,		108,249 "

The product averaged approximately 7,000 tons per month for the first five months of the year; with the resumption of full time operations, the product increased, averaging approximately 9,000 tons per month. There was some rock work done during every month of the year, but the heaviest rock program was under-way during the last three months of the year. The new find on the South footwall has been developed and mining started in the summer at a number of different

elevations. Mining has been started at the top of different areas, the ore body being mined in several blocks. It is narrow, but has a length of 900 feet.

The ore statement for the year 1922 is as follows:

	<u>FRANPORT</u>
On Hand January 1st, 1922,	166,842
Output for the Year,	<u>98,049</u>
Total,	264,891
Shipments for Year,	<u>11,437</u>
In Stock, January 1st, 1923,	253,454

The ore in stock on January 1st, 1923 was 253,454 tons as compared with 166,842 tons on January 1st, 1922; the increase in 1922 being 86,612 tons. In order to stock this ore it was necessary to build additional stockpile grounds and erect new trestles.

The ore in sight on December 31st, 1922 was 210,804 tons; a year ago there were 266,287 tons. This shows a decrease in total ore at the end of the year of 55,483 tons, but if the product of 1922 be included, there was actually an increase of 42,517 tons during the past year. Practically all of this ore was developed in the new find on the South footwall.

The estimate of ore in sight on December 31st, 1922 is as follows:

	<u>FRANPORT</u>
Ore on South footwall, (this includes the ore above the 5th Level on the South footwall and also the "New Find")	65,700 tons.
Ore above 5th Level, Main Ore Body North footwall,	<u>49,057</u> "
Total Developed Ore,	114,757 "
Prospective ore below 5th Level,	<u>96,047</u> "
Grand Total,	210,804 "

The estimated tonnage in the mine, sub-divided as required by the Tax Commission, is as follows:

Non-Bessemer:

Developed	1. Franport,	114,757 tons
Prospective	1. Franport,	<u>96,047</u> "
	Total,	210,804 "

The prospective ore below the 5th Level shows an increase of 6,047 tons as compared with the previous year. There is 49,000 tons of ore remaining to be mined above the 5th Level, on the North footwall. On the South footwall, including the "New Find", there is 65,700 tons.

During the past year the "New Find" on the South footwall has been developed. Its Eastern limit was reached in the summer, and shortly afterwards mining started. A short distance below the 4th Level, ore was found extending to the South on the regular dip of the footwall. This is to the South of the sharp fold where the new find was discovered. There is some possibility of additional ore being found in this territory, but it seems unlikely that the present limits of the ore body will be extended.

Owing to the shortage of working places in the early part of the year, it was decided to start mining a small block of ore above the 3rd Level. The 3rd Level was developed in previous years by two raises put up from the 4th Level on the North footwall. The ore is being mined by stoping without timber, as far as possible. At some points the stope has been carried to a point 40 feet above the 3rd, at others, only 20 feet. Only that ore is being mined which can be obtained at a reasonable cost per ton.

During the past year the work of sorting ore in the working places has been continued. In this way a large amount of lean ore and rock is removed underground. The ore hoisted during the past year

has averaged slightly higher in grade than heretofore, due largely to more mining in the new find, where the ore is more free from rock than in the main ore body.

A year ago the life of the mine was estimated at 3-1/2 years. It is now estimated that the mine can continue to operate from 1-1/2 to 2 years if no additional ore is discovered. The property should be abandoned as soon as the cost of the ore becomes too high to yield a profit, which condition will arise when there are not enough working places.

The ventilation during the past year has been good. At one time during the severe cold weather in December it was not possible to operate the fan except for a short time each day, due to ice forming in the Gwinn shaft, which is down-cast. A year ago the fan was located at the collar of the Gwinn Mine shaft. This prevented hoisting any rock or ore that came from re-timbering operations in the Gwinn Mine, so that the fan was moved, early in the year, to the Francis and installed on the 5th Level, near the concrete dam in the drift connecting the Francis and Gwinn Mines. The air is drawn from the Gwinn Mine and forced out of the Francis, and by the installation of a number of ventilating doors it has been possible to force the air into practically all working places. During the warm weather the ventilation was good at all times, the fan being operated eight hours per day. It was recently noticed that the timber was still rotting, although the air was good during the day. It was then decided to operate the ventilating fan 24 hours which would maintain a constant circulation of good air and prevent further rotting of the timber. The fan was operated 24 hours a day for a short time but the severe cold weather in December made it necessary to shut the fan down most of the day. The fan will be operated again on a 24-hour schedule as soon as the weather will permit.

In spite of every effort, the cost of production has been high during 1922, although it showed some improvement over the previous year. The work of developing the "New Find" was carried on during the first half of the year, but as soon as this was completed, it was necessary to start developing the 6th Level. The development of the 6th Level will be completed some time in 1923. At a number of points in the new find the ore body was only drift wide. The cost of the ore produced from drifting is much higher than from drifting and slicing.

A pumphouse and sump have been made on the 6th Level. As soon as mining starts below the 5th practically all the water which comes in on the 5th will go to the 6th Level. It will be pumped from the 6th to the main pumping plant on the 5th. It was decided to install the plunger pump formerly used on the 9th Level, Gwinn Mine. This pump was removed from the Gwinn Mine in the fall, and at the close of the year was being installed on the 6th Level. Ground has been excavated for a sump of 100,000 gallons capacity, which, it is figured, will be large enough so that the water can be pumped on day shift. The present pumping plant is operated on day shift only, as the main sump on the 5th Level is large enough to hold the water over the night shift.

Considerable re-timbering has been necessary during the past year, particularly on the 5th Level. It is estimated that over 1,000 feet of haulage drifts has been-re-timbered on this level during the past year. This was not due to rotting of the timber during 1922, but to the fact that ~~the~~ rotting had progressed to a point where there was very little strength left in the timber at the time the ventilating fan started to operate in 1921. At a number of places on the 5th Level mining operations are now being conducted only a short distance above the level, so that the timber is taking weight and as soon as this occurred, the rotten timber broke, requiring re-timbering of the drifts. A comparatively small amount of re-timbering will be necessary during the balance of the life of the mine.

Due to the large number of sub-levels on which work has been done during the past year it was deemed advisable to divide the Francis ore body into three parts, viz: the "New Find", the South Footwall and the North Footwall. It is hoped in this way to make the report of the work done during 1922 more clear. During the past year work has been done in the following territories:

1. NORTH FOOTWALL (First sub above 5th to Stopes above 3rd Level)
2. SOUTH FOOTWALL (1st Sub above 6th to 2nd Sub below 4th Level)
3. "NEW FIND" (Sub-levels from 2nd sub below 4th to 1st sub above 3rd)

NORTH FOOTWALL

STOPES ABOVE 3RD LEVEL:

During the year there was 70 feet of rock drifting done on the 3rd sub level, connecting drifts between the two raises which had been put up from the 4th Level to the elevation of the 3rd. An area 210 feet in length has been stoped out above the 3rd; this area being approximately 700 feet from the shaft. Stopes have been carried up on the footwall at some points a distance of 40 feet; at others not over 20 feet. The height of the stopes are determined by the dip of the ore body; where the ore body was steep it was possible to stope to a higher elevation than where the footwall was flat. This ore is trammed a distance of 300 feet on the 3rd Level, where it is dumped and is again trammed on the 4th Level a distance of 375 feet to the shaft. There is an area approximately 150 feet in length remaining to be stoped above the 3rd Level. Two contracts have worked here the latter part of the past year, and there should be work at this point for several more months. This ore has averaged about 56.50% in Iron.

1ST SUB ABOVE 4TH LEVEL.

At the East end of the North footwall one small pillar, approximately 20 x 16 feet in size was mined out in January, 1922. This finished the mining above the 4th Level.

4TH LEVEL.

In the early part of 1922, seven small pillars were mined at the East end of the main 4th level ore body on the North footwall. This completed mining of all the ore on the 4th Level.

2ND SUB BELOW 4TH LEVEL:

A small area was mined out under No. 1 crosscut, 4th Level, on this sub; this being the top of the pillar which had been left to support the timber slide formerly used between the 4th Level and subs below.

3RD SUB BELOW 4TH LEVEL:

Two pillars were mined on this sub-level in 1922, which finished the mining of all the ore at this elevation. Each had an area of approximately 50 feet by 25 feet.

4TH SUB BELOW 4TH LEVEL:

An area approximately 140 feet in length by 40 feet in width was mined on this sub-level. This completed the mining of the ore at this elevation on the North footwall.

5TH SUB BELOW 4TH LEVEL:

During the past year an area 300 feet in length by 50 feet in width was mined here, which completed the mining of the ore on this sub-level.

6TH SUB BELOW 4TH LEVEL:

This sub-level was also completely mined out in 1922. Its

length was approximately 380 feet; at the West end it was 70 feet wide, in the center 20 feet, and approximately 50 feet at the East end.

7TH SUB BELOW 4TH LEVEL:

This sub-level was being mined at the end of the year; six contracts working here. The ore body is 430 feet long on this sub-level and will average 40 feet in width. At the end of the year, about 70% of the ore had been mined.

8TH SUB BELOW 4TH LEVEL:

At the end of the year one gang was developing this sub-level preliminary to starting mining. This is the 1st sub above the 5th Level.

In the early part of the year several small areas at the East end of the ore body were mined on this sub-level, which completed mining in this territory above the 5th Level.

5TH LEVEL:

During the past year a drift was driven 200 feet in ore near the North footwall on the main 5th Level. Several raises were put up from this drift which were used in mining the ore on the sub-levels above the 5th. The last of the year this drift crushed so badly that it was considered impractical to attempt to keep it open any longer, and the rail and pipe are now being removed, preparatory to abandoning it.

SOUTH FOOTWALL.

2ND SUB BELOW 4TH LEVEL:

This sub-level was developed the latter part of the year by a drift 180 feet in length to the West end of the ore body. Stoping of ore between this point and the 4th Level has been started, and an area approximately 60 feet in length has been mined.

4TH SUB BELOW 4TH LEVEL:

Four small pillars on this sub-level were mined during the past year.

5TH LEVEL:

The South haulage drift on the 5th Level in the ore body was re-timbered during the past year. A raise which had formerly been used for mining ore on the South footwall was extended to a point 215 feet above the 5th Level. This provided another raise for handling the ore from mining operations at the top of the "New Find". The latter part of the year the cribbing in the old part of this raise broke and it was necessary to re-timber it a distance of 40 feet above the 5th Level. The latter part of the year another raise was started in the 5th Level haulage drift which was up 58 feet at the end of the year. This raise will also be used for mining the ore in the "New Find".

At the West end of the ore body on the 5th Level an area 130 feet in length by 20 feet in width was mined out in the fall. The ore above this area on the South footwall was mined in 1921.

The ventilating fan was moved from the Gwinn Mine to the 5th Level in the drift between the Gwinn and Francis Mines. It was installed near the dam which was put in this drift in the latter part of 1921. In order to install the fan it was necessary to remove some ground from the side of the drift; also build several headings to house the fan and control the air.

1ST SUB BELOW 5TH LEVEL:

The latter part of the year a sub-level, approximately 130 feet long was mined at the West end of the ore body on the South footwall. This is the small area which had been mined from the top of the ore body down to the 5th. Mining will be continued in this area until all the

ore is removed to the bottom of the ore body. On this sub-level the ore was only drift wide for a distance of 40 feet near the West end of the ore body, the balance of the area was 20 feet wide, the same as on the sub above.

1ST SUB ABOVE 6TH LEVEL:

This sub was opened when ore was discovered on the 6th Level, in order to determine the West limits of the ore body. The ore to the West of the raise was found to be 60 feet in length and only about 9 feet in width. This sub-level is evidently very near the bottom of the deposit.

"NEW FIND" - SOUTH FOOTWALL.

1ST SUB ABOVE 3RD LEVEL: (207' Above 5th Level).

This sub-level was opened at the top of the new find. The ore body at this elevation was 150 feet in length, for a distance of 35 feet near the center it averaged 20 feet wide; the balance was only 9 feet in width. Mining was completed at this point in the summer.

3RD LEVEL: (194' Above 5th Level).

The ore body on this sub-level, which was opened at the elevation of the 3rd Level, was 160 feet in length and 9 feet in width. Mining was finished here early in the fall.

7TH SUB ABOVE 4TH LEVEL: (182' Above 5th Level).

The ore body on this sub was 310 feet in length; 185 feet of the ore body at the East end was only 9 feet in width; the balance will average 15 feet in width. In order to complete mining on this sub-level as rapidly as possible, two contracts are working here, one on day and one on

night shift, mining the remaining pillars near the West end of the sub-level. Mining will be completed on this sub-level within forty days.

6TH SUB ABOVE 4TH LEVEL: (166' Above 5th Level).

The ore body on this sub-level is 565 feet in length. An area 300 feet in length at the East end of the sub-level had been mined out at the end of the year. In this area the ore averaged about 12 feet in width. At the West end of the sub-level an area 150 feet in length had been mined out. Mining was in progress on the balance of the sub-level, where the ore averaged 25 feet in width. Mining is not quite completed on the sub-level above, so that work on this sub-level is temporarily held up.

5TH SUB ABOVE 4TH LEVEL: (156' Above 5th Level).

This sub-level has only been partially developed. Two contracts are working here, one of which started at the West end of the ore body, drifting East; the other is working near the West end. There has been a total of 260 feet of drifting on this sub-level. The ore averages from 20 feet to 30 feet in width, and should have a length of approximately 400 feet.

3RD SUB ABOVE 4TH LEVEL: (131' Above 5th Level).

Development of this sub-level was started in 1921, and completed in the early part of 1922. An extension of the ore body some 200 feet to the East was discovered when this sub-level was developed. Mining of the East end of the ore body on this sub-level cannot be started until the ore has been mined on the sub-levels above. One crosscut, driven on this sub showed the ore body to be 40 feet wide. The West end of this sub-level was partially mined in 1921; mining of this area was completed early in 1922. At the end of the year the East 300 feet of the ore body was developed, ready for mining; the West 200 feet has been mined out at this elevation.

2ND SUB ABOVE 4TH LEVEL: (120' Above 5th Level).

An area approximately 80 feet in length, with an average width of 20 feet, was mined out at the elevation of this sub-level, early in 1922.

1ST SUB ABOVE 4TH LEVEL: (109' Above 5th Level).

This sub-level was partially developed in 1921, an area 150 feet in length was mined out in 1922, with the exception of two small pillars.

4TH LEVEL: (96' Above 5th Level)

This level was opened in 1921, the first work in the new find being done at this elevation. The West 300 feet of the new find was developed in 1921, the ore being followed to the West until it pinched out. Mining was started here in 1922, and completed at the West end the latter part of the year. On the North side of the roll in the footwall which divides the ore body on this level, an area approximately 120 feet long, with an average width of 15 feet was mined out by the shrinkage stope method. The ore was followed up on the footwall at one point a distance of 98 feet above the 4th Level. Across the top of the sharp fold in the footwall the ore pinched out. On the South side of the fold, at the elevation of the 4th Level, the formation dips on a flat angle to the South. The ore was stoped on this side of the level up to the point where the formation steepens, at which point the ore pinched out. The ore on this side of the level averaged about 15 feet in thickness, running from 55.00 to 56.00% in Iron. One gang was mining at the East end of this block at the close of the year.

1ST SUB BELOW 4TH LEVEL: (84' Above 5th Level)

This sub-level has been developed on the South side of the main fold in which the new find was discovered. The ore at the elevation of

this sub-level is lying almost horizontally with a slight dip to the South. At the West end of the sub the ore rises on the footwall to connect with the flat deposit on the 4th Level, South of the fold. At this point an area 70 feet in length by 60 feet in width has been mined out, the ore averaging about 14 feet in thickness. This sub-level has a total length of 350 feet, of which, as stated before, the West 70 feet has been mined out. The ore on the balance of the sub-level varies from 40 to 60 feet in width. Several minor folds or rolls in the formation have been disclosed by the work on this sub-level. The greater part of the sub-level lies fully 100 feet to the South of the main over-turn. Four contracts were working on this sub-level at the end of the year, one mining at the West end and three developing the East part of the sub-level. Further advance to the East has apparently been cut off by the hanging, but it is possible that at some point further North the ore may be found to extend around what undoubtedly is merely a local roll in the formation. The rising of the footwall to the East will undoubtedly cut this ore off at some point within a short distance of the present workings. On the South side of the sub-level the ore is lean, and is only from 4 to 5 feet in thickness, indicating that the enrichment does not extend any further to the South.

2ND SUB BELOW 4TH LEVEL:

This sub-level was developed early in the summer, the footwall being followed to the South-East from one of the 5th Level raises. It was soon noticed that the formation flattened and that the ore extended up on the foot further to the South. The ore was followed up at several points, resulting in the development of the 1st sub below the 4th, described in the previous paragraph. The ore body has been opened on this sub-level for a length of 170 feet. This sub seems to be practically at the bottom of the main fold. The ore here is comparatively narrow, and

averages about 15 feet in thickness. The ore was cut off at the East end of the sub-level by the footwall, which rises at an angle of approximately 28°. It is possible that the ore will average about 40 feet in width in this sub-level.

The above report of the work in the "New Find" shows that during the year work has been carried on at ten different elevations in this ore body. The extreme length of the ore measured from the West to East end along the axis of the trough is 900 feet. At least 50% of the ore has been mined. A number of sub-levels have been developed, ready for mining. If there are no further ore discoveries in this territory, the mining of this ore body will be completed in 1923. The discovery of this ore has prolonged the life of the mine at least one year.

DIAMOND DRILLING.

In order to gain information of the extent of the ore body to the South of the "New Find", at a point below the 4th Level, a hole was drilled in August from the 2nd sub below the 4th Level. This hole, No. 19, was horizontal and was drilled due South across the formation. The record of the hole is as follows:

Slate,	0 to 19
Arkose,	19 to 40
Slate,	40 to 72
Jasper,	72 to 75
Lean Ore & Jasper,	75 to 90
Jasper,	90 to 150
Chert,	150 to 156

No merchantable ore was encountered in this hole, and it was decided that it was not advisable to drill additional holes in this territory. From the information gained it seemed probable that the ore did not extend to the South any distance beyond this sub-level. It is interesting to note that since drilling this hole, ore has been developed on a sub-level above for a distance of 40 feet to the South, at which point it pinched out.

FRANCIS SURFACE.

The stocking trestles at the mine were filled in the summer, due to the fact that there was only a small amount of ore shipped from pocket and stockpile. The West ore trestle has been extended 260 feet, new stocking ground being made in this area; eight permanent and twenty-three stocking bents have been erected on the new South ore trestle; this new trestle is located between the two South stockpiles. It was considered that it would be less expensive to erect a trestle to fill the space between the two piles than to employ the necessary extra labor required to fill this space by side-dumping. The rock stockpile grounds were filled in the fall of 1922 and a new trestle has been constructed, which branched off from the old rock trestle near the shaft. There were seven stocking bents erected for handling rock. In addition to the above, two bents were erected in the spring as an extension to the old rock trestle, and four bents were added to the East stockpile of the South ore trestle, to take care of the hoist. Some work has been done recently clearing for additional stockpile grounds. It is assumed that the mine will continue to operate until all the ore is exhausted, which will require approximately two years. Additional stockpile grounds will be required even if shipments are made on a larger scale in 1923.

Additional shower baths were installed in the dry the last of the year, as there were ^{not} enough to permit the men to have baths without delaying their departure from the mine.

A ventilator was installed in the engine house the last of the year, as the air was not good when the compressor runs.

FRANCIS MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.
Franport,	56.28	.142	6.38	.487

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	Mine			
	IRON	PHOS.	SILICA	MANG.
Franport,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1922.

	FRANPORT	FRANWOOD	TOTAL	TOTAL LAST YEAR
On hand January 1, 1922,	165,253	1,589	166,842	111,987
Output for Year,	98,049	-	98,049	71,075
Transferred,	1,589	1,589	-	-
Total,	264,891	-	264,891	183,062
Shipments,	11,437	-	11,437	16,220
Balance on Hand,	253,454	-	253,454	166,842
Increase in Output,			26,974	
Increase in Ore on Hand,			86,612	

1922 -- 1-4 Hour Shift, 6 days per week, Jan. 1st to June 4th, 1922.
 1-8 Hour Shift, 6 days per week, June 5th to Dec. 31st, 1922.

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
 1-8 Hour Shift, 5 days per week, March 26th to June 1st, 1921.
 1-4 Hour Shift, 6 days per week, June 1st to Dec. 31st, 1921.

FRANCIS MINE

SHIPMENTS FOR YEAR 1922

	GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Franport,		10,437	1,000	11,437	16,220
Total,		10,437	1,000	11,437	16,220
Total Last Year,		10,630	5,590	16,220	
Decrease,		193	4,590	4,783	

Domestic
Bond
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FRANCIS MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	98,049	71,075	26,974	
Underground Costs	1.266	1.777		.511
Surface Costs	.244	.295		.051
General Mine Accounts	.179	.238		.059
Cost of Production	1.689	2.310		.621
Plant Account	.600	.605		.005
Extraordinary Drifting		.043		.043
Taxes	.105	.150		.045
Central Office	.082	.099		.017
Contingent Expense	.011	.012		.001
Cost Adjustment	.028	.098		.070
Cost on Stockpile	2.515	3.317		.802
Loading & Shipping	.010	.028		.018
Total Cost on Cars	2.525	3.345		.820
No.Days Operating	301	291	10	
Mo.Shifts & Hours	1-8hr	1-8;104		
Avg.Daily Product	326	244	82	
<u>COST OF PRODUCTION</u>				
Labor	1.133	1.537		.404
Supplies	.556	.773		.217
Total	1.689	2.310		.621

FRANCIS MINE.

FRANCIS MINE

COMPARATIVE WAGES & PRODUCT

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	98,049	71,075	26,974	
No.Shifts & Hours	1-8hr	1-8;1-4		
AVG. NO. MEN WORKING				
Surface	23	23		
Underground	84	78	6	
Total	107	101	6	
AVG.WAGES PER DAY				
Surface	3.90	4.49		.59-13.1%
Underground	4.25	5.13		.85-16.6%
Total	4.18	4.97		.79-15.9%
WAGES PER MO. OF 25 DAYS				
Surface	97.50	112.25		14.75
Underground	106.25	128.25		22.00
Total	104.50	124.25		19.75
PRODUCT PER MAN PER DAY				
Surface	17.21	13.50	3.71	
Underground	5.09	4.50	.59	
Total	3.93	3.37	.56	
LABOR COST PER TON				
Surface	.227	.332		.005
Underground	.836	1.141		.305
Total	1.063	1.473		.410
AVG.PRODUCT BRK'G & TRM'G	7.87	7.61	.26	
" WAGES CONTRACT MINERS	4.30	5.15		.85
" " " TRAMMERS				.
" " " LABOR	4.30	5.15		.85
TOTAL NO. OF DAYS				
Surface	5696-3/4	5263	433-3/4	
Underground	19269	15810-3/4	3458-1/4	
Total	24965-3/4	21073-3/4	3892	
AMOUNT FOR LABOR				
Surface	22237.41	23606.97		1369.56
Underground	81985.07	811124.70	860.37	
Total	104222.48	104731.67		509.19

Proportion Surface to Underground Men:

1922 - 1 to 2.54
 1921 - 1 to 3.39
 1920 - 1 to 2.56
 1919 - 1 to 2.32
 1918 - 1 to 2.20

1921
 1-8hr 6 days a week to Mar.26;
 1-8hr 5 " " Mar.28 to May 31;
 1-8hr 4 " " June 1 to Dec.31.

1922
 1-8hr 6 days for whole year

FRANCIS MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1922.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT	AMOUNT
			1 9 2 2	1 9 2 1
4" to 6" Timber	1,190	.0175	20.88	258.40
6 to 8 "	52,281	.0277	1,447.22	2,147.43
8 to 10 "	31,688	.0571	1,810.64	2,143.40
10 to 12 "	8,106	.0775	628.53	1,499.25
12 to 14 "	2,848	.1076	306.52	609.86
14 to 16 "	152	.1278	19.43	100.76
Total - 1922	96,265	.0440	4,233.22	
Total - 1921	93,872	.0720	6,759.10	6,759.10
5' Lagging	90,525	.0225	726.53	1,744.93
8' "	301,010	.7405	2,228.90	2,338.91
Total Lagging	391,535	.7548	2,955.43	4,033.84
Poles	7,770	1.265	98.31	62.66
Total - 1922	399,305	.7648	3,053.74	
Total - 1921	418,096	.99177	4,146.50	4,146.50
5/8" Covering Bds.(ft)	42,512	1.273	541.18	

Product	98,049	71,075
Feet of timber per ton of ore	.982	1.320
" lagging "	3.993	5.803
" " per foot of timber	4.067	4.394
Cost per ton for timber	.04317	.0951
" lagging	.03014	.0575
" poles	.0010	.0088
" covering boards	.00552	
" timber, lagging, poles, and bds.	.07983	.1614
Equivalent to stull timber to bd.measure	151,151	154,677
Feet of bd.measure per ton of ore	1.542	2.176

Total cost for timber, lagging & poles	1922	7,286.96
	1921	10,905.60
5/8" Maple covering	1920	3,456.13
boards used during	1919	8,117.15
year in place of	1918	5,210.68
lagging.		

Mine operated 1 shift, half time, from Jan.1st to June 5, 1922.
 " " 1 " full " June 5th to Dec.31st

FRANCIS MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY	AVERAGE PRICE.	AMOUNT 1922.	AMOUNT 1921
40% Standard Powder	31,737½	14.24C	4,520.33	4,493.62
50% " "	825	16.35	134.86	34.00
60% " "	1,788	18.76	335.34	50.63
<u>Total Powder</u>	<u>34,350½</u>	<u>14.53</u>	<u>4,990.53</u>	<u>4,578.25</u>
Fuse	150,500'	.747C	1,124.80	954.96
Caps	27,100	1.175	318.48	277.38
Cap Crimpers	10	.543	5.43	7.08
Tamping Bags	5,600	2.151M	12.09	22.46
<u>Total Fuse, Etc.</u>			<u>1,460.80</u>	<u>1,261.88</u>
<u>Total All Explosives</u>			<u>6,451.33</u>	<u>5,840.13</u>
Product			98,049	71,075
Pounds Powder per Ton of Ore			.350	.383
Cost per ton for Powder			.0509	.0644
" " Fuse, Etc.			.0149	.0177
" " All Explosives			.0658	.0821
Avg. Price per Lb. for Powder			.1453	.1680

Mine operated 1 shift half time from Jan. 1st to June 5, 1922.
 " " 1 " full " " June 5th to December 31, 1922.

GARDNER-MACKINAW MINE

SURFACE:

All the mine buildings were painted by the contractor, with the spray machine, at the time the houses in the Gardner-Mackinaw Location were painted.

The square timber at the Gardner-Mackinaw Mine was loaded and shipped to the Stephenson Mine. This timber was purchased, a short time before the mine closed down, to be used in timbering the Mackinaw shaft when it was sunk to greater depth.

The greater part of the ore in stock at the Mackinaw Mine was removed during the past year. Tracks were installed in the Fall, so that the balance of the ore can be loaded out. Arrangements were made between the M. M. & S. E. Ry. Co., and the C. & N. W. Ry. Co., whereby the M. M. & S. E. Ry. Co., loaded and handled the ore from the Gardner stockpiles. The railroad track used for unloading timber at the Mackinaw was extended to the North and a connection made to the C. & N. W., track at the Gardner Mine. The greater part of the Gardner ore was shipped, together with a small tonnage of Gardner High Sulphur.

The motor for the Gardner Mine hoist, together with the electric equipment, was taken from the Gardner to the Stephenson Mine where it was installed on the skip hoist. When operations are resumed here it will be necessary to obtain another motor and electric equipment to replace this motor.

During the summer the water storage tank at the Mine was kept filled with water to provide fire protection for the mine. The water

line to the location was over-hauled so that in case of fire water could be forced to the location by the electric pump at the mine. Fire protection is needed for the location to fight forest fires on the sand-plains, which, in dry seasons, are a serious menace. A plowed strip about 20 feet in width, which extends entirely around the location has been kept free of grass and brush during the summer months, to provide additional fire protection.

GARDNER-MACKINAW MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1922.

GRADE	IRON	PHOS.	SILICA	MANG.	SULPH.
Gardner,					(No Production)
Gardner High Sulphur,					(No Production)
Mackinaw,					(No Production)
Mackinaw High Sulphur,					(No Production)

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1922.

GRADE	IRON	PHOS.	Mine SILICA	MANG.	SULPH.
Gardner,					(All Mixed)
Gardner High Sulphur,					(All Mixed)
Mackinaw,					(No Shipments)
Mackinaw High Sulphur,					(All Mixed)

ORE STATEMENT - DECEMBER 31ST, 1922.

	GARDNER GARDNER	GARDNER HIGH SULPHUR	MACKINAW MACKINAW	MACKINAW HIGH SULPHUR	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1922,	28,144	48,454	-	24,408	101,006	120,736
Output for Year,	-	-	-	-	-	-
Stockpile Overrun,	-	-	-	-	-	159
Total,	28,144	48,454	-	24,408	101,006	120,895
Shipments,	21,217	680	-	18,283	40,180	19,889
Balance on Hand,	6,927	47,774	-	6,125	60,826	101,006
Decrease in Output,					159	
Decrease in Ore on Hand,					40,180	

1922 -- Mine Idle during Year.

1921 -- Mine Idle during Year.

GARDNER-MACKINAW MINE
SHIPMENTS FOR YEAR 1922.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gardner,	-	21,217	21,217	-
Gardner High Sulphur,	-	680	680	-
Mackinaw,	-	-	-	5,816
Mackinaw High Sulphur,	-	18,283	18,283	14,073
Total,	-	40,180	40,180	19,889
Total Last Year,	-	19,889	19,889	
Increase,	-	20,291	20,291	

Vermaer
Bond
 MADE IN U.S.A.

GARDNER-MACKINAW MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 2	1 9 2 1	INCREASE	DECREASE
PRODUCT	-	-		
No.Shifts & Hours				
Avg.NO. MEN WORKING				
Surface	3	2	1	
Underground	3	4		1
Total	6	6		
AVG.WAGES PER DAY				
Surface	3.49	4.17		.68-16%
Underground	3.78	5.05		1.27-25%
Total	3.62	4.71		1.09-23%
WAGES PER MO. OF 25 DAYS				
Surface	88.25	104.25		16.00
Underground	94.50	126.25		31.75
Total	90.50	117.75		27.25
PRODUCT PER MAN PER DAY				
Surface				
Underground				
Total				
LABOR COST PER TON				
Surface				
Underground				
Total				
AVG. PRODUCT BRK'G & TRM'G				
" WAGES CONTRACT MINERS				
" " " TRAMMERS				
" " "				
TOTAL NO. OF DAYS				
Surface	836	557½	287½	
Underground	732-3/4	866½		163-3/4
Total	1568-3/4	1424	144-3/4	
AMOUNT FOR LABOR				
Surface	2915.27	2323.33	591.94	
Underground	2766.12	4379.40		1613.28
Total	5681.39	6702.73		1021.34

Proportion Surface to Underground Men:

1922 - 1 to 1
 1921 - 1 to 2
 1920 - 1 to 3.3
 1919 - 1 to 3.

Mine idle since Nov. 30, 1920.

GENERAL SURFACE.

GWINN DISTRICT ORE CRUSHER:

Repairs on the Crusher started in April and were completed by the middle of May. A number of chutes were rebuilt, new plank and plate being installed. The rollers under the fan belt from the Crusher to the loading pocket were thoroughly overhauled; in fact, the entire plant was given a thorough inspection and overhauling before operations were started. The crusher went into commission on May 23rd; it was operated on single shift until the last day of the month, when it started operating double shift. It continued to operate on double shift part of the month of June, then went back to single shift for the balance of the year. After the month of June the crusher did not operate steadily, as there was relatively small shipments from the district. The crusher ceased operating in October.

Following is the summary of ore crushed in 1922-1921:

<u>NAME OF MINE:</u>	<u>TONS CRUSHED 1922</u>	<u>TONS CRUSHED 1921</u>
Stephenson,	78,914	76,935
Gardner-Mackinaw,	40,180	19,889
Gwinn,	26,436	64,427
Francis,	11,437	16,220
Princeton,	5,449	6,014
Austin,	<u>2,714</u>	<u>000</u>
Total,	165,130	183,485
DECREASE 1922,	18,355	

The crusher was operated 96 days in 1922 as compared with 87 in 1921. It, however, operated more days on double shift in 1921 than in 1922. There was also more days in 1922 when there was not sufficient ore to keep the crusher operating to capacity.

The Operating cost in 1922 was exactly the same as in 1921, viz: \$.024 per ton; the Maintenance cost decreased .004, while the General Expense increased .009 in 1922. The increase in General Expense occurred in two items - "Mine Office" and "Personal Injury", the increases being respectively .0018 and .0076. The increase in "Mine Office" is due to more expense for clerk hire; the increase in "Personal Injury" is due to a settlement of accident alleged to have occurred at the crusher in 1920, Francis Mine Accident Report No. 97. In addition to settlement for past compensation, regular compensation payments are being continued, which has resulted in a fixed charge of \$56.00 per month to this account. The depreciation of plant was completed in 1921 so that there was no charge to this account in 1922. For this reason the grand total cost for crushing ore in 1922 was 6.1¢ as compared with 8.3¢ in 1921.

GWINN TOWNSITE:

One lot in Gwinn Townsite was sold during the past year, viz: Lot 15 of Block 15. A frame building, formerly used as a bath house, was moved on this lot and set on a concrete foundation. Alterations are under-way to make it into a dwelling house.

Extensive repairs were made to the Gwinn company houses in 1922, in preparation for painting. All the double houses, with the exception of the new houses erected within the last few years, were painted by the spray system. All the houses had two coats; some were given three and others had three on the South side and the front of house above the porch. The appearance of the town has been materially improved.

The Hotel and Hospital Block were painted by hand in the summer. These buildings had not been painted for many years and needed re-painting.

AUSTIN LOCATION:

The work of repairing the Austin houses for painting was started as soon as the houses had been repaired at Gwinn. A careful examination disclosed the fact that six of the houses were resting on the ground due to rotting of sills and joist. It was decided to raise these houses 18" when repairs were made, and set the posts supporting the house on concrete footings so that no timber would be in contact with the ground. The expense of this work was considerable, but it will result in less repairs in the future and in the end will cost less than if the houses had not been raised. The improvement at this location is more noticeable than any of the others, as there was one row of houses here which had previously been painted a red color. In painting the houses this year five different colors were used, which were alternated on the houses, resulting in a very marked improvement in the appearance of the location. The siding on a number of the Austin houses were in bad condition due to lack of paint, so that the expense of repairs this year were much higher than in previous years, as it was necessary to repair the exterior of every house thoroughly before paint was applied.

2 Considerable repairs were made to the company barn, located on the Austin property, and it was also given a coat of paint, while the contractor was painting the company houses.

PRINCETON LOCATION:

All of the sixteen company houses at this location were painted, immediately after the work at the Austin Location was completed. In repairing these houses for painting it was found that more repairs than had been expected were necessary. In renewing the sheeting which had rotted near the base of several of the houses, it was found that the sills and joist were entirely gone due to dry rot.

GENERAL SURFACE: